Comments received from Natenna Dobson, Physical Scientist, Department of Energy, Office of Oil and Natural Gas

Comments on EPA's 2010 Hydraulic Fracturing Study Scope by DOE's Office of Oil & Natural Gas

Review of SAB's Comments on Study Scope

1. **Agree** – Short-term research should be directed to study sources and pathways of potential impacts of hydraulic fracturing (HF) existing and potential drinking water resources. Impacts to potential water resources in general should be investigated later, possibly with the long-term research goals.
2. **Agree** – Using a lifecycle framework, without actually performing a formal lifecycle assessment, b/c of time and resources factors to identify most important research question.
3. **Agree** – Having research questions look at impacts at all various stages of the hydraulic fracturing lifecycle on drinking water sources.
4. **Disagree** – Should concentrate on human health and environmental concerns that are specific to or significantly influenced by hydraulic fracturing, and not common to all oil and gas production activities. **The final framework should concentrate on impacts of HF associated with natural gas operations only, especially for shale gas. Investigating HF for gas operations will help to focus time and resources on the best approach to meet the 2012 deadline and focus the study on the most currently use of high-volume HF in the nation.**
5. **Agree** – Develop a risk-based research prioritization approach to characterize the risk of human and ecological exposure to hydraulic fracturing fluids and products.
6. **Agree**- Compile and review available data and knowledge on HF in peer-reviewed literature from various sources at the beginning of the research study.
7. **Disagree**- Perform in-depth case studies at five to ten different locations selected to represent the full range of regional variability of HF across the nation. **Instead, the framework may be best served by stepping back and analyzing issues at a larger scale (e.g., basin, watershed, or regional) analysis.** It may be difficult to assess impacts at this scale and data at this level may be seriously lacking thereby resulting in costly analyses or analyses that are less meaningful for decisions at the national level.
8. **Disagree** – Potential secondary effects associated with HF should be considered (e.g., arsenic mobilization in groundwater and aquifers due to enhanced methane transport and resulting changes in redox conditions. Many of the gas extraction practices listed on page one (1) are independent of HF and do not appear relevant to the study. **Drawing a clear box around HF operations will help to focus and possible eliminate some of the proposed research questions.** For example, site preparation operations are independent of HF operations/fluids, thus research questions associated with these operations could be eliminated. **The final framework should**

also consider only those questions directly related to the Congressional charge and avoid questions that stray from this scope (e.g., characterizing emissions) or result in uncertain or ambiguous conclusions.

9. **Agree** – Indentify a few overarching, fundamental questions which can be placed in order of priority before revising the research plan.
10. **Agree**- Develop a balanced, collaborative advisory group of stakeholders representing a broad range of perspectives and have the group engaged throughout the research process. **A stakeholder involvement plan which defines who are the stakeholders of interest, and how, when, and to what degree stakeholders will be engaged in the study process should be detailed in the study. Develop a formal communication plan which defines key roles, responsibilities, and interfaces between EPA and other Federal Agencies (e.g., DOE/NETL, DOI, BLM, USGS, etc.) that are participating in the study.**
11. **Disagree-** Economic analyses such as cost-benefit analysis are not included in the ORD research plan. **To be relevant to policy formulation, some type of cost-benefit analysis (including an energy impact analysis) should be included in the research plan, even if it is incorporated in a long-term research plan. This cost-benefit analysis should take into account the best management practices that operators can cost-effectively implement, based on geological and other local factors in the gas play.**
12. **Agree –** EPA should engage with relevant states to inventory and conduct performance evaluations of the effectives of state hydraulic fracturing regulatory, technological development, and BMP activities.

Additional Comments

1. Make a special effort to investigate existing federal and state regulations including those currently being proposed. This should include a contrast and comparison of regulations as well as a discussion of potential opportunities for coordination and streamlining with state and federal agenices.
2. The study should seek to 1) dispel any erroneous perceptions pertaining to HF and 2) not presume prior-conclusions. For example, a research question proposed deals with 'restoration of impacted aquifers.' This proposed research predisposes that aquifers are or will be affected. Questions framed such as this are not appropriate for a study of this nature and further, lie outside the Congressional request.
3. The study framework should aim to avoid research questions that result in the need for long and costly implementation and maintenance. Examples might include: long-term monitoring of wells, development of GIS databases, and detailed reservoir /watershed models.