Concerns about shale gas risks among interested and affected parties

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Abstract

The development of natural gas resources in deep shale formations is accompanied by a wide range of potential risks and hazards. Some of these risks have received careful analysis and assessment, but many other risk concerns have received little public, academic, or regulatory attention. Following the lead of the 1996 National Research Council report, *Understanding Risk: Informing Decisions in a Democratic Society*, which recommended that risk analyses begin by identifying the risk concerns of the interested and affected parties, we sought to identify these concerns with respect to unconventional shale gas development. Using an Internet-based public elicitation process, we targeted engaged and informed individuals, initially through email invitations to groups involved in shale gas development or advocacy. The elicitation instrument contained an open-ended prompt soliciting concerns related to any aspect of shale gas development.

We received 373 responses to this elicitation. Responses were coded manually using Glaser and Strauss' constant comparison method. Concerns were categorized as “precursors” of development, “hazards,” “hazard events,” “risk amplifiers,” or “consequences,” according to a modified version of Kates, Hohenemser and Kasperson's causal model of risks. The coding process yielded 135 unique categories of concern and 2,611 total codes. Consequence concerns were the most common type. The most commonly-raised individual concerns were groundwater contamination, air quality, poor regulations, and health impacts.

Many concerns identified by respondents are well known and are receiving significant attention

from analysts. However, the elicitation also highlighted several areas of significant concern that have not yet received major analytic attention:

1. *Quality of life issues.* A number of concerns about the consequences of gas development relate to an erosion of quality of life for people living in the area, including increases in community conflict, crime, and changes in the landscape and sense of place due to industrial-style development for shale gas production. For instance, one respondent reports that "our quiet, tree-lined gravel road has been turned into an industrial zone, trees torn down, road widened for the trucks." Another talks about gas development "[s]plitting the community, [instigating] anger of residents against residents."

2. *Economic impacts on gas producing communities.* Among the frequently expressed economic concerns are two that have not yet received much analytical attention. One concern was about the potential for "crowding out of other industries in communities where fracking could occur," for example, the disruption of "traditional economic drivers in small upstate New York communities, including farming, wine/beer making, tourism, [and] higher education." Another was expressed in terms of declining property values in communities where quality of life and water are perceived to have been harmed.

3. *Impacts on localities distant from gas production sites.* Most current attention to impacts of shale gas development focuses on impacts in the immediate vicinity of well sites. Some respondents, however, raised concerns about impacts that occur in other locations. For instance, a few respondents raised concerns about the environmental and health impacts of mining and preparation of sand used in fracturing. Others were concerned about "importation" of wastes from fracturing activities elsewhere (usually in other states); these concerns were often raised alongside concerns that the receiving communities are being targeted because they lack the political clout to resist waste importation.

4. *Climate change.* Many respondents expressed global concerns, particularly about climate change impacts. These concerns include fugitive methane emissions, which have received considerable attention from experts, but also concerns about gas development hindering the development of renewable energy resources and technologies or discouraging conservation. This concern shows that for many respondents, concerns about shale gas go beyond the suite of issues often associated with locally unwanted land uses.

5. *Quality and availability of information.* A wide range of concerns relate to the availability and quality of information needed by policy-makers and the general public. Many respondents expressed concern about industry secrecy about the chemical composition of fracturing fluid. Others raised concerns about withholding of information from affected people, by gas companies and even by neighbors and medical personnel under "gag orders" not to reveal what they have learned about contamination and health effects. More broadly, many respondents raised concerns that industry and political leaders are actively withholding, falsifying or obfuscating important information about potential impacts of shale gas development. Some also raised concerns about possible bias in scientific studies funded by industry and the perceived lack of adequate research and baseline data to assess fully the impacts of development.

6. *Regulation and regulatory capture.* Numerous respondents expressed concerns that regulatory systems fail to provide adequate protection for the public interest and to hold the industry accountable. They variously noted exemptions from federal environmental laws, the absence of needed regulations at other levels, poor quality of regulation, and inadequacy of enforcement, due in some views to inadequate capacity and in some to "capture" of agencies or courts.

7. *Ethics and justice issues.* Key issues for several respondents were the fair distribution of harms and benefits from resource development and the rights of affected individuals and communities

to participate meaningfully in such governance processes (e.g., “shale gas extraction does NOT help the poor... how is it fair to drive people out of homes that they have worked their entire lives to pay for?”) Other respondents objected that decisions about development are being made without input or consent from local governments or populations that will be affected, violating basic principles of procedural justice. A related concern was with “trampling of human rights”.

8. *Water resources and wasted water.* Many respondents raised concerns about groundwater contamination such as are being investigated by the US EPA and others. In addition, respondents expressed concern about water as a scarce resource. These concerns cited equity (Who bears the burden of providing the water?), competition among users for freshwater resources, and alleged wasteful water use practices in the gas industry.

9. *Impacts to ecosystems and domestic animals.* Respondents raised concerns about impacts on the well-being of ecosystems and animals. In addition to contamination of water supplies, several respondents raised concerns about destruction, degradation, or fragmentation of habitat. Many also mentioned possible health impacts on livestock and companion animals, which would be disruptive to quality of life and to economic activities like dairy farming.