



**Center for Healthy Environments
& Communities**
University of Pittsburgh | Graduate School of Public Health

Prepared for the Secretary of Energy Advisory Board Natural Gas Subcommittee

June 14, 2011

Summary of Challenge: Local Public Health Implications of Marcellus Shale Activities

1) General Issue: full disclosure of all slick water fracturing chemicals used and their amounts

Central to all of the issues related to chemical safety is the full release of information concerning the chemical, including its chemical structure and physicochemical properties. This is necessary for effective protection through early detection of potential adverse toxicological effects to human health and the environment, and through training of local emergency responders as to the potential for fire and explosion events. Dosage is an important component of understanding the risk of chemicals, whether to cause toxicity or to cause fire and explosion.

2) Physical Environment and toxicity Issues

a. Water pollution and surface water withdrawals

Marcellus Shale activities provide multiple threats to water sources. The threats come from diverse sources including the fracking chemicals; high volume hydraulic fracturing; the natural gas and related hydrocarbon production products; and the release of naturally occurring subsurface and surface contaminants such as arsenic, bromide and radionuclides. Activities related to the production of natural gas, such as removal of wastewater to treatment plants, also pose threats. Production failures and spills have already led to substantial releases that have contaminated and closed water sources used by the public.

b. Air pollution

As with water pollution, diverse activities can lead to local air releases. These include the fracking chemicals; volatile organic compounds (VOCs) such as benzene, a known cause of human leukemia; diesel emissions; and fugitive releases of pipelines, compressor stations, and all other natural gas extraction processes from extraction to production. Contribution to ground level ozone through the release of oxides of nitrogen and hydrocarbons is also a threat

c. Soil pollution

Physical disruption to surface and subsurface areas are also potential health problems, especially due to the legacy pollution existent in the Marcellus Shale region. Toxicity due to persistent or persistently-

released chemicals can be of concern. Uptake of chemicals into agricultural produce, or future land use activities that might site a children's playground, are among the scenarios that need to be considered.

3) Safety Issues

a. Fires and explosions

Natural gas is flammable – which is its ultimate use. Explosions and fires affecting the public have already occurred and are a continuing menace.

b. Traffic incidents

Many of the Marcellus Shale related activities increase heavy truck traffic, especially on unsuitable secondary roadways, thereby increasing the likelihood of traffic incidents. Roadway degradation and loss of structural integrity also increases the risk of traffic incidents

c. Criminal activities

An increase in criminal activities, including violence and substance abuse, has been observed in association with hydrocarbon drilling activities elsewhere in the country and already has been reported in Pennsylvania. For example, failure of out-of-state workers to register under Megan's Law has been an issue.

Recommendations:

- 1) Full disclosure of information about all chemicals used in all activities related to the Marcellus Shale is an absolute necessity to protect public health and the environment. It is also in the best interest of the Commonwealth and of industry. As has been amply demonstrated following the recent Gulf Oil disaster, secrecy about chemicals strongly intensifies public anxieties. It enhances the likelihood of lawsuits and legislation that limits Marcellus Shale activities. Note that any competitor can easily analyze any chemical used by other companies – so only the public and government officials responsible for emergency response or to respond to public health issues are being kept ignorant.
- 2) Assessment of the health impact of Marcellus Shale activities is required through prospective study of affected communities. The Pennsylvania Department of Health (PADOH), in cooperation with state university academic experts, should be asked to rapidly develop a major health study of affected communities. This prospective study should include measurements of exposure levels as well as health outcomes. This study should be envisioned as a baseline for comparison with other potentially affected communities. Without such a study, it will be difficult to detect adverse health consequences, or to determine whether observed disease clusters are due to the vagaries of chance or are related to Marcellus Shale activities. This study should begin immediately.
- 3) Physical and chemical measurements by the Commonwealth of air and water pollutant concentrations and of soil contamination need to be increased dramatically. To sufficiently monitor changes and needs, adequate resources should be made available to the Commonwealth and municipalities where drilling activities are occurring. The cooperation of

citizens groups and academic programs should be enlisted, but this must be considered to be a state responsibility. The focus should be on chemical and physical agents of potential health and environmental concern.

- 4) It is important that state and local health capabilities be greatly increased. The size of Pennsylvania's public health workforce ranks last in the nation, and few of the counties in which Marcellus Shale activities will take place have local health departments.
- 5) A holistic approach to health and safety issues is required. Thorough analysis of all risks, including those related to safety and criminal activities, should be part of any decision.

Summary of Challenge: Regional Public Health Implications of Marcellus Shale Activities

A large percentage of the Commonwealth's population is already exposed to levels of ozone beyond the current standard – a standard which is likely to be made more stringent due to increasing scientific evidence of ozone toxicity. Marcellus Shale activities, particularly if extended to the many thousands of wells that are projected, are likely to present a significant increase in ozone precursors. If so, it is likely that more of the state will not be in compliance and will have a limitation on industrial activities in order to prevent childhood asthma and other significant health effects caused by ozone.

Recent evidence also indicates that the contribution of methane, a greenhouse gas, to global climate change (GCC) is greater than previously appreciated. GCC is a direct and indirect public health threat for many reasons, including increasing the likelihood of weather patterns that potentiate ozone formation.

Recommendation:

It is in the best interest of the Commonwealth to analyze and regulate Marcellus Shale activity as if it were a single pollution source rather than multiple small sources, particularly in relation to ozone formation. Methane (natural gas), the goal of Marcellus Shale activity, should be considered to be a valuable product and its release highly restricted.

Summary of Challenge: Worker Health Implications of Marcellus Shale Activities

Worker safety translates into community safety for two reasons. First, as was exemplified by the Deepwater Horizon event, 11 workers died in the acute event that should have been prevented through consideration of worker safety. Also, in the Marcellus Shale situation, community growth is assumed to occur through the addition of workers to the population. Thus, anything affecting workers will also affect the community. The observation by CHEC that there is a wide range in violations per well, per company suggests major disparities in the extent of a safety culture that would protect workers and the community.

Recommendation:

In order to protect workers and the public, strict enforcement of worker safety standards is necessary. Companies with a poor record in this regard should lose their ability to participate in Marcellus Shale activities.

Summary of Challenge: Coordinating of State Resources Involved in Preventing and Responding to Health and Environmental Threats

Many state agencies are involved in protecting workers and the public and in responding to threats related to Marcellus Shale activities. Gaps in coverage, as well as unbalanced oversight functions, are likely to occur.

Recommendation:

A coordinating council of state agencies involved in preventing and responding to Marcellus Shale activities needs to be established. It should be chaired by the DEP Secretary and report to the Governor. Its goals should include development of clear pathways for oversight and response. Public health should be a major responsibility of this Council.

Summary of Challenge: Well Pad location

The current limit of 200ft from a building does not appear to be adequate to protect from noxious gases, fumes, or intense long protracted noise levels (i.e. flaring, truck traffic, compressors). The result of this close proximity is creating complaints from neighbors who have not leased or agreed to the industry operating in such close proximity to their residence. This creates tension and stress due to what is perceived as invasion of privacy. Reports of illness due to fumes and noxious gases, lack of sleep and proper rest are frequent. Well pads only 200' from a residence also is a threat due to explosion related to gas leakage incidents, which happen occasionally with this type of industry.

Recommendation

Distance from well pad to a building should be increased to 1500ft from a residence with the ability to obtain a waiver if the well pad siting must be closer to a residence and that waiver will be dependent on additional sound and environmental controls. When there is not enough distance or an ability to locate a well pad in a proper location with enough distance from a neighbor's residence, every effort should be made to apply sound controls (i.e., sound walls, and controls on compressors and generators), and environmental controls to capture gases, and fugitive emissions. Industry may have to consider in these special locations that are in very close proximity to neighbors, offering to house the residents in a hotel or other facility for the period of time there is intense industry activity.

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