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Clifford S. Mitchell, MD, MS, MPH
Director, Environmental Health Bureau
Prevention and Health Promotion Administration
Maryland Department of Health and Mental Hygiene
201 West Preston Street, Room 327
Baltimore, MD 21201
Via Email

**RE: Review of Potential Public Health Impacts of Natural Gas Development
and Production in the Marcellus Shale in Western Maryland**

Dear Dr. Mitchell:

Thank you for the opportunity to review this July 2014 draft Final Report.

Overall, I believe the Draft Report identifies the main issues that are likely to affect public health in Western Maryland. I have some suggestions that I believe will improve the report and address issues that are likely to be important to the public.

In my judgment, the draft Final Report addresses the major issues identified in the scoping document. I also believe that the updated scope described in section 8 of the draft document addresses the main issues of concern.

I have reviewed the entire report, but my comments pay particular attention to the Executive Summary. In general, the report is well written. Several sections are good summaries of the state of the science and/or the regulatory context. As noted below, there are places where the clarity and editing can be improved. The following section outlines recommendations about the Executive Summary, followed by comments on the subsequent sections of the report.

Executive Summary

This Executive Summary is a good recapitulation of the more important conclusions from the more detailed sections of the report. I would suggest that a map of the area that shows main towns and population density should also be part of this section. One of the maps in the current appendix could be used to address this issue. Table 6-1 and the accompanying text explain the rationale for

the hazard ranking the authors have done and summarizes the main findings of the report. The eight major issues are reasonable and each has sufficient scientific literature to justify it as a separate section in the report. I do not think the term “Flowback and Production Water–Related” should be used as a heading, however, and suggest you use “Water Quality,” which is similar to the rest of the hazard categories and not focused on process. The current heading hides more than it reveals because the potential sources of contamination and the uncertainties surrounding the sources of potable water for the population at risk are the key scientific uncertainties. A revised heading that focuses on the environmental media and not on the UNGDP process seems more appropriate given the aims and scope of the report.

The report should clearly state that there is insufficient data to determine the relative percentage of ground versus surface water as the source of drinking water for the ~100,000 residents in the two counties where UNGDP may occur. This point is an important scientific uncertainty that should be highlighted because the potential hazards and pathways to surface water (e.g., impacts from spills) are different from the potential pathways to ground water wells (e.g., a leaking well casing). Even if it is not completely clear what fraction of the population gets their water from these two distinct sources, best case estimates would help to public understand the strengths and limitations of this report.

The text on page xxiv states that property owners without mineral rights are vulnerable. While there is ample scientific evidence that individuals perceive risks to be greater when they are not voluntarily assumed (see the work of Paul Slovic and colleagues), this issue is distinct from more traditional definitions of vulnerability, i.e., age, sex, genetics, etc. I suggest treating this as part of psychosocial stress and cumulative risk, but not frame it as vulnerability.

Recommendation 14 suggests that up to a 2000 foot setback is needed to protect public health from air quality, noise and other hazards. Scant scientific rationale for this is presented in the Executive Summary, though later text in the body of the document indicates that this recommendation is based the traffic-related air pollution literature that shows that in many cases air pollution near major roads approaches background levels at 500-700 meters from the roadway. Given that this recommendation will be highly scrutinized, the rationale for this choice should be clearly stated in the Executive Summary. While I agree that the bulk of the studies show that traffic-related air pollution declines to background at this distance, the UNGDP process may be more continuous (e.g., compressor stations) and episodic in different ways than traffic from major roads. The authors should clearly state the basis for their suggested setback, and note that additional measurements, modeling, and knowledge about processes on well pads are needed to address the scientific basis for setbacks.

Other Comments

The Baseline Assessment section has a lot of data, and often describes changes in disease rates at the county level and compares it to a comparison group. A summary table that shows how mortality and morbidity rates vary relative to an appropriate baseline would help make clear the characterization of the two counties where UNGDP may occur. Additional bolding or color coding could be used to indicate the rates that should substantial differences from baseline.

This Impacts Assessment section will benefit from additional editing and more careful citation. Several figures in this section, e.g., 10.5, 10.6, 10.7, do not have clearly labelled axes. Furthermore, as written the difference between the 25 and 75% scenarios is not clear.

In reading the document, it is not clear how potential setbacks may pertain to water sources. Additional clarity on this issue would improve the presentation.

The authors should be encouraged to publish the noise pilot study given the relatively small peer reviewed scientific literature on this topic.

The recommendations seem appropriate given the findings. It may be useful for the authors to explicitly state that the recommendations are based on expert judgment, and that cost and feasibility were not considered as part of their development.

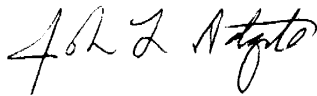
Lastly, the report clearly identifies itself as an HIA. I think the title should reflect the adoption of that methodology.

Conclusions

As I noted in my initial review of the Scoping document, the lack of substantive research to address the main public health concerns about UNGDP is still one of the major limitations facing both public health experts and decision-makers. This report is a good implementation of the HIA methodology. It should help inform Maryland decision-makers on the potential public health impacts of UNGDP.

Thank you for the opportunity to review the Draft Document, and please contact me if you have questions.

Sincerely,

A handwritten signature in black ink that reads "John L. Adgate". The signature is written in a cursive style with a large initial "J" and "A".

John L. Adgate, PhD, MSPH
Professor and Chair
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Colorado School of Public Health