

2 Information Gaps

Throughout the HIA we identify numerous information gaps. Indeed, the rationale of the HIA is to provide recommendations in the face of incomplete information. The recommendations are based on what is known about the natural gas industry, health impacts of air and water pollution, and the community of Battlement Mesa. Where information gaps exist, our recommendations err on the side of health protectiveness.

In this section we present the information gaps identified by the HIA process. We also discuss the implications of these gaps and provide recommendations to remedy these gaps.

2.1 Information Gaps and Implications

- 1) We don't know all chemicals emitted by natural gas processes or used by the industry.

We need to know about the chemicals being used and emitted in order to predict health effects and know how to respond in an emergency.

- 2) We don't know all the known sources of emissions in the natural gas industry.

We need to know the sources of emissions in order to engineer better pollution prevention methods and to understand short- and long-term exposures. We need to know when water is contaminated.

- 3) We don't know the levels of chemicals people are exposed to.

We need to know exposure levels in order to know what kinds of health effects to expect and if there would be short term or long term health effects. We need to know exposure levels to know if mitigation is needed. We need to determine safe setbacks.

- 4) We don't have physical or mental health tracking data.

We need to have health tracking data to follow health trends over time.

- 5) We don't have community health measures.

We need community health measures to monitor community well-being.

- 6) We don't know the health impacts of air pollution from gas production facilities.

We need to know if declining ambient air quality is having adverse effects on Battlement Mesa Residents.

2.2 Remedies

To protect public health we recommend decreasing chemical emissions to the lowest possible levels. We also recommend that monitoring take place on each well pad and at the water storage facility for the duration of the project. If emissions exceed action levels specified in the specific recommendations in Section 3, additional mitigation steps can be taken. Specific recommendations for reducing chemical emissions are found in Sections 3.1 and 3.2.

To fill information gaps we recommend further investigation to document environmental exposures and subsequent health effects of the natural gas industry. To that end, the BOCC has provided funding to CSPH to design a long term Environmental Health and Monitoring Study (EHMS) in Battlement Mesa and/or Garfield County to address these issues. This long term study will:

- 1) Characterize emissions during odor events, normal development and production operations, and during accidents and malfunctions (when possible). This will require disclosure of chemicals used during all development and production operations.
- 2) Monitor air emissions during all development and production operations. Develop methods to detect water contamination. Ensure all results are publicly available.
- 3) Conduct sampling at multiple setbacks. Model resident exposures and validate models with field sampling.
- 4) Develop data sources to monitor physical and mental health status of Battlement Mesa residents.
- 5) Develop community health measures to monitor community well-being in Battlement Mesa.
- 6) Conduct epidemiological studies using existing state, hospital and insurance data sources to investigate health effects of ambient air quality on the general population.

In order to obtain necessary data to fill the information gaps, cooperation from the industry is required.