

1.0 Introduction

The city of Fort Worth is home to extensive natural gas production and exploration as it lies on top of the Barnett Shale, a highly productive natural gas shale formation in north-central Texas. The Barnett Shale underlies 23 counties, including four (Tarrant, Denton, Wise, and Parker) that lie partly within the Fort Worth city boundaries. Over the last several years, natural gas production in the Barnett Shale has increased dramatically. This increase in activity has been brought about by advancements in drilling technologies, most notably hydraulic fracturing and horizontal drilling.

As the Barnett Shale formation is located beneath a highly populated urban environment, extraction of natural gas from it has involved exploration and production operations in residential areas, near public roads and schools, and close to where the citizens of Fort Worth live and work. Due to the highly visible nature of natural gas drilling, fracturing, compression, and collection activities, many individual citizens and community groups in the Fort Worth area have become concerned that these activities could have an adverse effect on their quality of life.

In response to these concerns, on March 9, 2010, the Fort Worth City Council adopted Resolution 3866-03-2010 appointing a committee to review air quality issues associated with natural gas exploration and production. This committee was composed of private citizens, members of local community groups, members of environmental advocacy groups, and representatives from industry. The committee was charged to make recommendations to the City Council on a scope of work for a comprehensive air quality assessment to evaluate the impacts of natural gas exploration and production, to evaluate proposals submitted in response to a solicitation for conducting this study, and to ultimately choose a qualified organization to conduct the study.

The goals of the air quality study, as established by the air quality committee, are to help city officials answer the following four questions:

- How much air pollution is being released by natural gas exploration in Fort Worth?
- Do sites comply with environmental regulation?
- How do releases from these sites affect off-site air pollution levels?
- Are the city's required setbacks for these sites adequate to protect public health?

In order to answer these questions, the air quality committee identified several key tasks that should be included in this study: ambient air monitoring, point source testing, and air dispersion modeling.

Ambient air monitoring was conducted to measure outdoor pollution levels. Ambient air monitoring was included in the Fort Worth Natural Gas Air Quality Study to measure air pollution levels near selected natural gas facilities.

Point source testing was conducted to determine how much air pollution is being released by natural gas production in Fort Worth, and if natural gas extraction and processing sites

comply with environmental regulations. Under this task, various types of air testing equipment were used to detect, identify, and quantify the type and amount of air pollutants being emitted.

Air dispersion modeling was used to estimate the incremental air quality impacts caused by emissions from natural gas facilities. The modeling results provide perspective on air pollution levels at locations where, and at times when, ambient air samples were not collected. The results were used to assess whether the city's required setbacks (as published in City Ordinance No. 18449-02-2009) are adequately protective of public health.

Finally, a health evaluation compared the results of the ambient air monitoring program and air dispersion modeling to protective health-based screening levels. For selected pollutants, additional context was provided on toxicity and pollution levels typically observed at other locations in Texas.

This report presents the results of each of these tasks and activities, and is organized into eight sections as follows:

- Section 1 – Introduction. This section provides background information on the study.
- Section 2 – Ambient Air Monitoring. This section describes how the ambient air monitoring network was designed and implemented, and presents the ambient air monitoring results.
- Section 3 – Point Source Testing. This section describes how the point source testing task was conducted, what equipment was used, and how the data obtained was used to estimate emissions. The section also summarizes point source testing results.
- Section 4 – Air Dispersion Modeling. This section describes the air dispersion modeling task. It documents the major inputs, assumptions, site configurations, and results.
- Section 5 – Public Health Evaluation. This section interprets the ambient air monitoring data and the air dispersion modeling data from a public health perspective. It also comments on whether the setbacks are adequately protective of public health.
- Section 6 – Regulatory Assessment. This section provides details on the types of air quality regulations that may apply to natural gas exploration and production activities, and draws conclusions (where appropriate) on whether the sites visited under the point source task comply with applicable regulatory thresholds.
- Section 7 – Full Build-Out Estimates. This section discusses the factors expected to affect the growth of natural gas exploration and production in Fort Worth in the coming years and estimates future peak air emissions in Fort Worth.
- Section 8 – Conclusions and Recommendations. This section draws upon the results of each of the project activities to answer the four questions that defined the overall scope of this study. Several recommendations are also provided.