



Mobile Measurements of Leaks Associated with Oil and Gas Development and the Impact on Air Quality

Scott Herndon (1), Peter DeCarlo (2), Tara Yacovitch (1), Douglass Goetz (2), Cody Floerchinger (1), Joseph Roscioli (1), Joanne Shorter (1), and Charles Kolb (1)

(1) Aerodyne Research, Inc., Billerica MA, USA, (2) Drexel University, Philadelphia PA, USA

In the United States, horizontal drilling and hydraulic fracturing technologies have enabled a rapid increase in the production rate of oil and natural gas. Frequently, the shale sources are located near large urban centers (such as Dallas/Fort Worth, TX) and smaller communities. The transient drilling activity as well as the long-term installation of wells, processing and transmission facilities have the potential to affect associated emissions to the atmosphere of methane, volatile organic compounds, NO_x , particulates and other species.

Using a mobile laboratory, measurements have been conducted in several active shale play production areas and at specific facilities. The regions include the Barnett shale in Dallas/Fort Worth, the Denver Julesberg Shale near Denver, and the southwest and north-central regions of the Marcellus shale near Pittsburg and Mansfield, respectively. Results of the quantification of the specific natural gas leak rate from specific facilities will be presented and discussed. Also, differences in the emissions profile from the various regions will be highlighted. The intra-regional contrasts will also be presented such as those observed in the Barnett shale in the ethane to methane ratio, demonstrating its use as an “isotope-like” signature of the source. Regional scale measurements of the observed levels of air pollutants downwind and upwind of the shale play sectors will be shown. The data from the Marcellus region will put into context on how further development of the gas resources impacts air quality in a region upwind of the highly urbanized east coast corridor.