Determining Tropospheric Ozone Trends in Pennsylvania from 2007 to 2012

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ABSTRACT

There has been little research conducted and published on hydraulic fracturing’s effect on air quality, specifically on the six NAAQS Criteria Pollutants. This preliminary study attempts to assess current air quality monitoring systems and utilize tropospheric ozone data to determine whether or not there is a significance in variation among three sites in Pennsylvania from 2007 to 2012. It also looks at the possible trend between tropospheric ozone levels and the number of active well sites within the state during the same time period. Although consistent, agreeable, and easily accessible data is difficult to come by, a 2-Way ANOVA shows significance in variation based on location and time. Furthermore, Pearson’s Correlation Coefficient depicts some positive relationship between tropospheric ozone levels and the number of active fracking well sites. A completely comprehensive air quality study would take into account all aspects of the fracking process, not just wells.

BACKGROUND & FOCUS QUESTIONS

The State of Pennsylvania is among the leading producers of natural gas via conventional and unconventional hydraulic fracturing mechanisms. “Fracking” is a highly controversial alternative fuel extraction process with little scientific data published in regards to its effects on general air quality.

Under the 1970 Clean Air Act (CAA), Congress granted the Environmental Protection Agency (EPA) authorization to regulate air quality and emissions. The National Ambient Air Quality Standards (NAAQS) provide national thresholds and monitoring systems for harmful and/or hazardous air pollutants.

RESULTS CONTINUED

Looking back at the four focus questions:

1) Sufficient data: There may look to be sufficient monitoring stations, but the actual consistency of CP data is sparse, inaccurate, and variable. Data in rural areas (where fracking is heavy) is very limited.

2) How to improve: More sites in rural areas and those closer to fracking activities would give a better picture of air quality in relationship to natural gas extraction.

3) Significant ozone: Location and time interval both play roles in tropospheric ozone variation. Ozone trends tend to follow national patterns.

4) Association with fracking: Active wells do seem to play some part in O3 trends. The entire process of hydraulic fracturing needs to be assessed and included in further studies to determine if fracking as an entity leads to higher tropospheric ozone levels. Wells alone do not account for all patterns.

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