Exhibit A

Understanding Iowa's Particulate Matter Episodes

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Background

The 2006 United States $PM_{2.5}$ standard[1] under the Clean Air Act has a 24 hour standard of 35 micrograms per cubic meter of air ($\mu g\ m^{-3}$). More specifically, compliance with the Clean Air Act is determined by the measured concentration at air quality monitoring stations. The Iowa DNR measures $PM_{2.5}$ concentrations at a number of locations around the state, and attainment or nonattainment of the Clean Air Act standards is determined by averaging the 98th percentile concentrations over the past three years (e.g. 2005, 2006 and 2007). For monitors with a full complement of 365 daily samples, the 98th percentile rule means that the 8th highest value in a given year determines attainment.[2]

Two $PM_{2.5}$ monitors in the state of Iowa have 2005-2007 values that are above the 35 $\mu g\ m^{-3}$ attainment threshold (Scott Country/Davenport Blackhawk Foundry, and Muscatine's Garfield Park). Furthermore many other Eastern Iowa monitors are just below the standard. While the nonattainment sites are impacted by local industrial emissions, regional $PM_{2.5}$ episodes contribute significantly to concentrations at all sites in Iowa, especially in Eastern Iowa. While year-to-year variability is large with respect to $PM_{2.5}$ episodes, an average year has approximately 2 cold season episodes, typically from November to March, where multiple Iowa monitors are above the 35 $\mu g\ m^{-3}$ standard. These episodes have lasted anywhere from 1 to 5 days. The longest lasting episode was for 5 days beginning January 30, 2005. The most polluted episode was a 3 day event in December 2007 with concentrations at more than 4 sites in excess of 55 $\mu g\ m^{-3}$. Summertime 24 hour air quality standard exceedance events also occur, but with somewhat less impact to $PM_{2.5}$ nonattainment during 2005-2007.

Wintertime regional PM episodes are not unique to Iowa, but occur throughout the upper Midwest. Public health, visibility, and economic development are all influenced by the episodes and their leverage on the air quality compliance. They cannot be controlled by individual site-specific control measures, but require a broad regional control strategy, sometimes aimed at multiple types of pollutants that contribute to $PM_{2.5}$. Good understanding of the sources and particulate matter formation processes that contribute to the episodes is required in order to formulate effective control strategies. There is a possibility that a string of winters with above average PM episodes could put large portions of Eastern Iowa out of Clean Air Act compliance. Some key urban monitor values that show the important of regional formation events during 2005-2007 are Iowa City, Clinton, Cedar Rapids, and Davenport, with $\mu g\ m^{-3}$ values of 34, 32, 29, and 32 respectively.

Rationale for University of Iowa Study

In recognition of these facts, the University of Iowa is proposing a study entitled "Understanding Iowa's Particulate Matter Episodes." The University of Iowa, primarily through the Center for Global and Regional Environmental Research, has a long record of research in particulate pollution and atmospheric

[1] PM2.5 is particulate matter (e.g. airborne particles including dust, smog and pollution) smaller than 2.5 microns in diameter. This size cutoff was selected by EPA to distinguish between fine (smaller than 2.5 micron) particles that deposit primarily in the lung and course (larger than 2.5 micron) that deposit primarily in the nose and throat.
[2] Most PM2.5 monitoring locations in Iowa are on a 1 in 3 day schedule. Some sample every day.

science. The science of understanding and forecasting both short and average PM concentrations and speciation are at the heart of the research programs of Charles Stanier and Greg Carmichael. Helping to solve problems of state priority (such as regional PM exceedances) is part of the core mission of the University and its research centers and faculty members.

Two-Phase Study Design

An initial pilot study is proposed (phase I) that will conclude in early 2009, and have as a key milestone a draft report on wintertime PM episodes in December 2008. This timeline has been selected so that University of Iowa research results will be available concurrently with EPA decisions on nonattainment status in Iowa. Phase I will conclude in early 2009 with a final report and with a proposal for phase II as needed. The scope of phase II is not currently delineated.

Phase I Objectives and Timeline

- Phase I will be focused on the examination of existing scientific, measurement, and modeling data to better understand PM formation episodes in Iowa, with a focus on the more severe wintertime events.
- A draft report will be delivered by December 15, 2008 and a final report will be delivered by January 31, 2009. The use of existing information for the report makes possible the short timeframe.
- Report will include sections on (i) data analysis of historical (2004-2008) $PM_{2.5}$ measurements in Iowa to determine spatial patterns in regional episodes and relationship between episode occurrence, year-to-year variability in episodes, and design values; (ii) data analysis of speciation data from Iowa and other upper Midwest locations to identify sources (e.g. secondary nitrate) and their relative contributions during episodes; (iii) analysis of meteorological information to identify the range of conditions favoring episodes; (iv) review of published reports and papers on wintertime Midwestern PM formation; (v) review of published reports and papers discussing model-data agreement relevant to these episodes; and (vi) discussion of scientific uncertainties in PM formation that may be relevant to these episodes.

Phase I Budget and Work Plan

- All work will be done under the direction of faculty members Charles Stanier and Gregory Carmichael.
- University of Iowa personnel may consult with experts and stakeholders such as EPA, IDNR, IDED, and regional planning organization personnel. However, the final content of the report "Understanding Iowa's Particulate Matter Episodes" will be under sole discretion of the University of Iowa investigators and no formal peer review or approval will be sought.