Written Testimony

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Mr. Chairman and members of the Committee, thank you for giving me the opportunity to testify today regarding the results of two, recent independent analyses that my firm, Alpine Geophysics, LLC has conducted on behalf of the Midwest Ozone Group. These two studies utilized state-of-the-science data, methods and models to provide (a) an emissions and air quality trends picture for a recent ten year period, (b) residual ozone and particulate matter nonattainment results for a 12km modeling domain (study area) over much of the central, Midwestern and northeastern United States and (c) a list of nonattainment and maintenance monitoring sites for 2012 which based on air quality observations from 2006 through 2009, were determined to already achieve attainment of the target National Ambient Air Quality Standards (NAAQS) in EPA's Proposed Transport Rule (75 FR 45210; PTR) and final Cross-State Air Pollution Rule (76 FR 48208; CSAPR).

**Introduction**

On August 2, 2010, the U.S. Environmental Protection Agency (EPA) issued *Federal Implementation Plans To Reduce Interstate Transport of Fine Particulate Matter and Ozone; Proposed Rule* stating that:

> *EPA is proposing to limit the interstate transport of emissions of nitrogen oxides (NOX) and sulfur dioxide (SO2). In this action, EPA is proposing to both identify and limit emissions within 32 states in the eastern United States that affect the ability of downwind states to attain and maintain compliance with the 1997 and 2006 fine particulate matter (PM2.5) national ambient air quality standards (NAAQS) and the 1997 ozone NAAQS.*

In support of this proposal (and resulting final rule), EPA developed and processed base year 2005 and future year emission inventories from multiple source categories with emissions and air quality models to determine relative contributions to downwind nonattainment and to simulate changes in air quality as the result of control strategy implementation.

Alpine conducted two separate studies to compare with the findings of the proposed EPA rule. Specifically, we have identified two major areas in which our assessment differs markedly from that conducted by EPA. Firstly, EPA did not use the most recently available emissions inventories and air quality measurements at the time of its rulemaking, and secondly, EPA did not account for the air pollution controls and related emission reductions that have been or are being installed to satisfy the requirements of the Clean Air Interstate Rule (or CAIR).

The first project was designed to quantify historical changes in ozone and particulate matter precursor emissions and the associated changes in air quality attributed to those emissions changes from a ten year period covering 1999 through 2009. The second analysis was designed to develop a residual ozone and particulate matter nonattainment picture for a study area over much of the eastern United States utilizing more recent emissions and air quality data and an alternate 'Business As Usual' future year scenario for 2014 and 2018 (comparable to EPA's Clean Air Interstate Rule or CAIR) that were simulated by EPA in support of its proposed rules and to additionally use these more recent design value data to determine which of EPA's identified nonattainment or maintenance sites were actually already in attainment with the NAAQS based on observations from 2006-2009.

**Emissions and Air Quality Trends**

The objective of our first project was to develop and present publicly available information on trends in emissions and ambient air quality in the United States over the period 1999 through 2009 in easy to understand visual and tabular formats. In addition to the quantitative historical summary provided, we included a qualitative assessment of meteorological influences on these trends as available for temperature and rainfall anomalies. Our metrics were developed for the United States using sub-regional groupings of States (Figure 1).


**Figure 1.** Sub-regional state groupings for emissions and air quality trends analysis.

We collected and processed publically available EPA emission inventories[1] for years within the study period of interest (1999-2009) by pollutant and source category to develop the trends for the analysis. To improve the year to year quantification of emissions, we augmented the EPA data with year specific continuous emissions monitoring (CEM) emissions (2002 through 2009) and year specific wildfire emissions data (2005 through 2008). Categories were grouped in our study as follows:

- electric generation (EGU) coal fuel combustion,
- electric generation non-coal fuel combustion,
- industrial fuel combustion,
- other fuel combustion,
- industrial processes,
- on-road vehicles,
- non-road engines and vehicles, and
- miscellaneous (including wildfire, prescribed fire, agricultural activities, etc.).

Our findings (examples provided in Figures 2 and 3) were comparable to EPA national level published reports[2] of emissions and air quality trends and confirm that in each region analyzed, we confirmed that all pollutants have decreased since 1999 in aggregate with some demonstrated intermediate year increases typically due to variability in year-to-year fire emissions. NOx and SO2 from electric utility fuel combustion sources show a significant decrease over time as a result of the Acid Rain Program, NOx Budget Trading Program and CAIR control implementation. All pollutants (except ammonia) from the highway and off-highway vehicles categories show decrease over time as a result of various mobile source fuel and fleet rulemakings, including the Tier 2/Gasoline Sulfur rule and Heavy Duty Engine/Vehicle and Highway Diesel Fuel rules.

Correspondingly, we computed and summarized ozone and fine particulate matter (PM2.5) design value trends for each region in the eastern United States for the same period of 1999 through 2009. These design values were calculated at both State and regional levels and for each three year period we computed the average of design values across all monitoring sites meeting data completeness requirements. The 8-hr ozone and 24-hr and annual particulate matter design values for each overlapping three-year period started with 1999-2001 and ended with 2007-2009 and were calculated based on EPA data handling conventions. Our results found that average 8-hr ozone and both the average annual and 24-hour PM2.5 design values have decreased in all five regions during the ten year period. (Figures 4, 5 and 6).

[1] http://www.epa.gov/ttn/chief/eiinformation.html
[2] http://www.epa.gov/airtrends/index.html

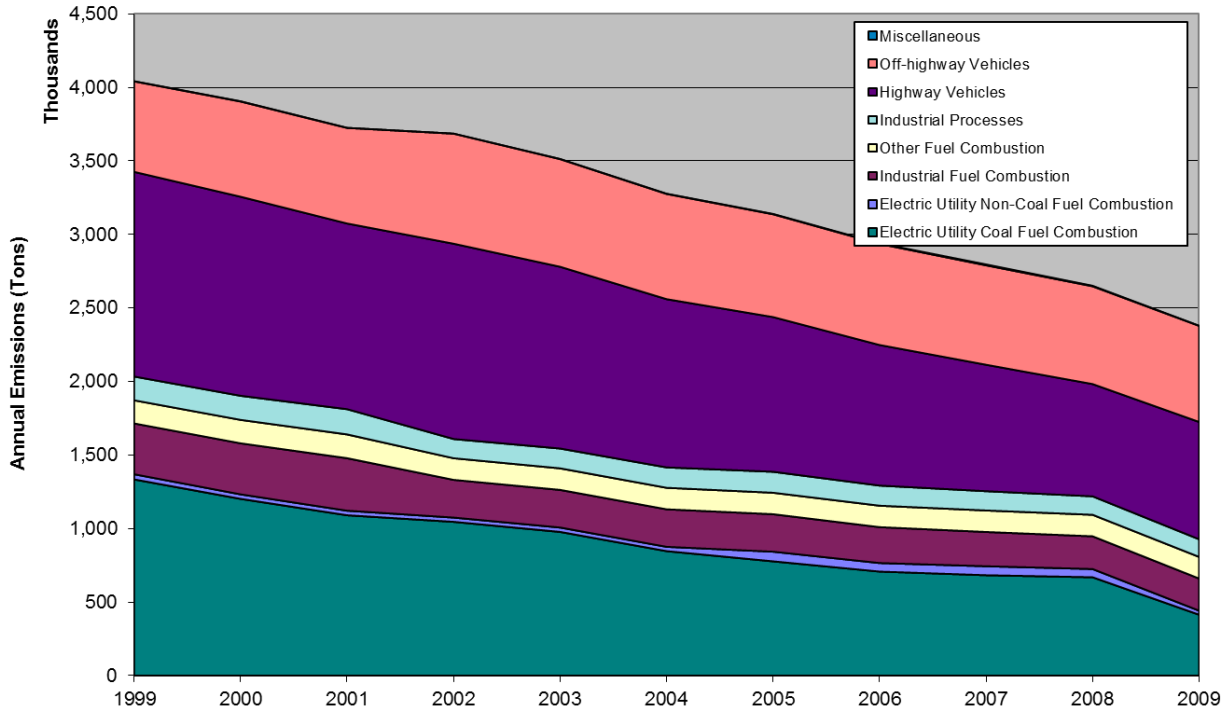


**Figure 2.** Midwestern states NOx emission trends.

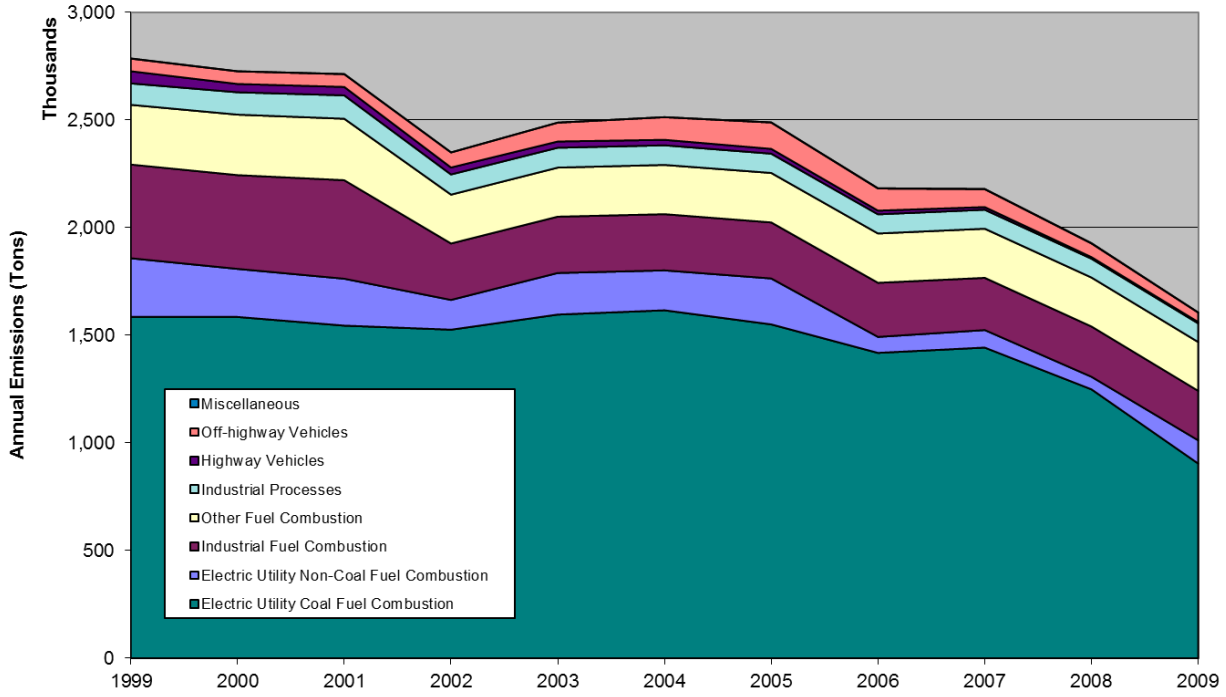


**Figure 3.** Northeastern states SO2 emission trends.

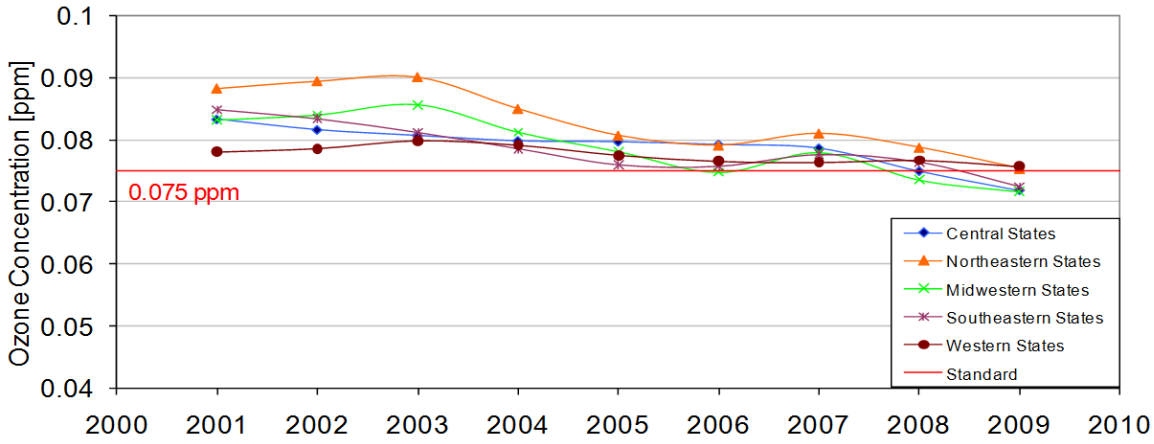


**Figure 4.** Regional average 8-hr ozone design value trends.

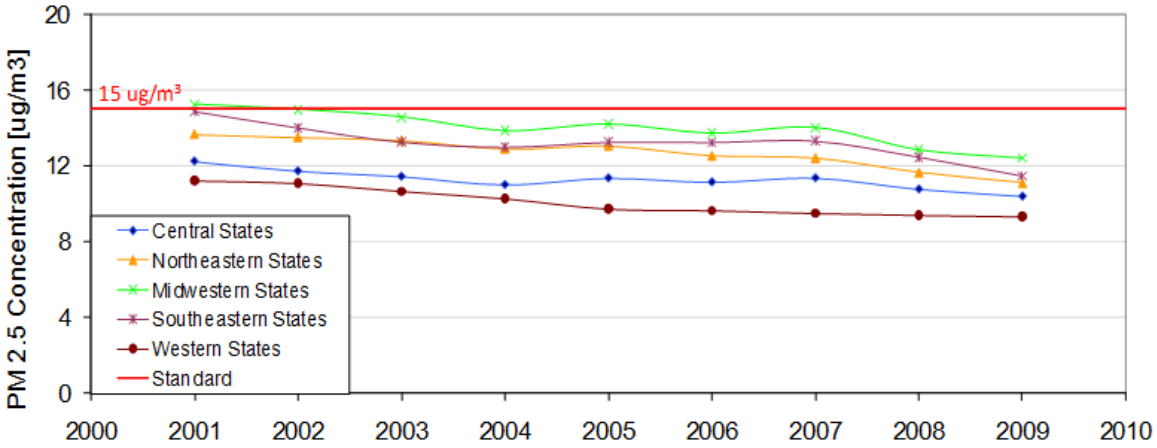


**Figure 5.** Regional average annual PM-2.5 design value trends.

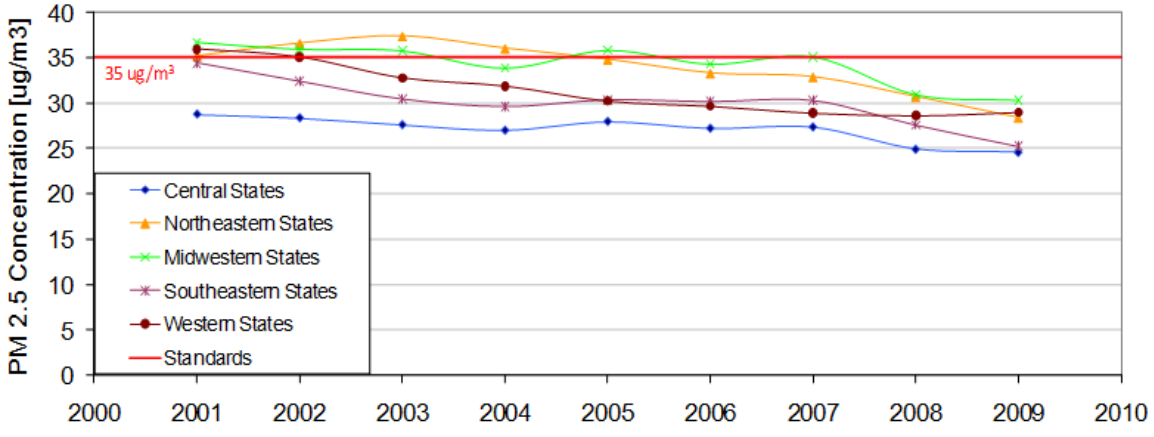


**Figure 6.** Regional average 24-hr PM-2.5 design value trends.

**Ozone and Particulate Matter Attainment Modeling**

The objective of our attainment modeling analysis was to perform technically credible photochemical modeling, including the EPA attainment test, for three key years: 2008, 2014, and 2018 for comparison with projections published by EPA in its rule proposals. Modeling for year 2008 served the important objective of providing a recent 'typical baseline' year for the purpose of calculating relative response factors (RRFs), which tie observed design values to the air quality modeled results. Most importantly, moving to 2008 took direct advantage of recent reductions in ozone and particulate matter design values measured across the eastern State study area (Figure 7) and the controls and related emission reductions that were already occurring in response to CAIR. Results of our work clarified when the effects of 'Business As Usual' (BAU) state and federal control programs would begin to significantly lower the 8-hr ozone and annual and daily PM design values at key monitors in the study area.

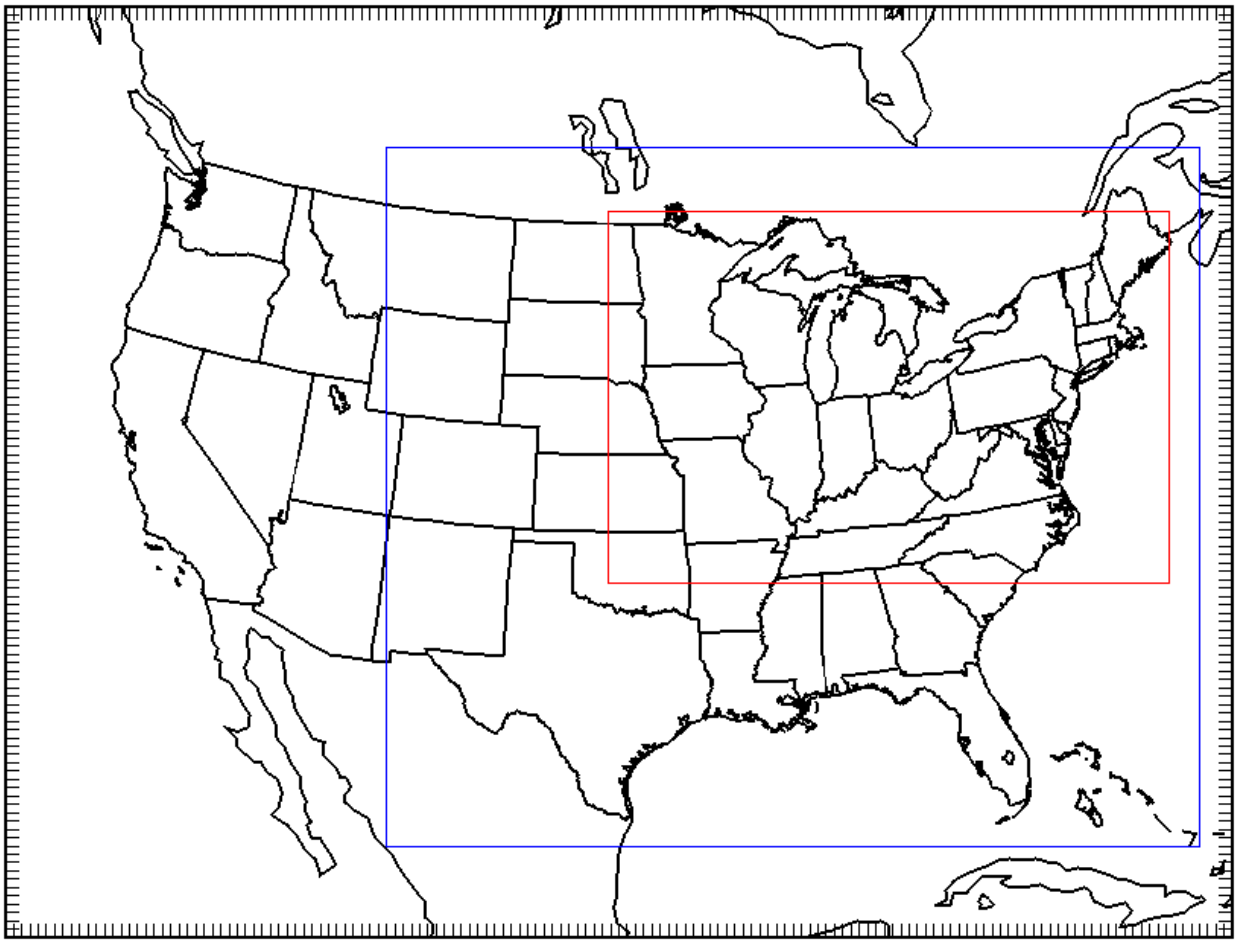

**Figure 7.** 36/12 km CAMx modeling domain. Red box represents eastern State study area.

We constructed the summer (8-hr ozone) and annual (PM2.5) 2008 base year model performance evaluation inventories and future year 2014 and 2018 inventories using the most recent EPA 2005v4 data sets as the foundation. To these foundation files we updated the base year inventories to contain (a) 2008 Clean Air Markets Division (CAMD) CEM data for EGU sources (as reported under various programs and accounting for controls installed through 2008), (b) 2008 year specific vehicle miles traveled (run through the MOBILE6 tool to generate onroad emissions), (c) wild and prescribed fire emissions (from EPA's SMART Fire contract), and (d) biogenic emissions using a most recent version (v2.03a) of the MEGAN biogenics emissions model. All data that we used for the upgrades is and was available to and through EPA as it prepared its proposals.

The non-EGU future year inventories included all pertinent growth and control measures 'on the books' up to that year as provided by EPA's PTR data distribution[3] as well as additional consent decree and local and state program data available at the time of our modeling. Additional growth and control data obtained from EPA were applied to EPA's 2005v4 to generate 2008 emissions and fill in the 2008 inventory in whole. In cases where growth and control data were not available, interpolations of EPA 2005 and 2010 inventories were used for 2008 emissions.

To determine future SO2 and NOx emissions for EGUs, we utilized output from the Emission-Economic Modeling System (EEMS), which is a modeling system that has been used by individual utilities and organizations to evaluate the economic and compliance implications of environmental policies and rules. EEMS is a computer model that was developed in 1997 to perform specific emission and economic analyses of environmental policies and regulations impacting the electric utility and coal industries. In general, EEMS uses a set of decision rules to identify a combination of control options (technology versus allowances) that approximates the least cost solution for a given utility system under a specific regulatory (e.g., trading) regime.

The SO2 and NOx emission forecast for this analysis ('Business As Usual') assumed compliance with the Clean Air Interstate Rule, as well as known utility agreements contained in Consent Decrees and State programs. The future regional electrical generation by fuel type and regional fuel forecasts that were incorporated into the model were from the Energy Information's Administration's Annual Energy Outlook 2009 (AEO2009) - Updated Reference Case[4].

The modeling inventories developed for the 2008 base year and the 2014 and 2018 forecast years were prepared using the same technical methodologies as employed by EPA for the PTR and CSAPR. These inventories, founded upon the base and future year modeling analyses performed by EPA have undergone considerable QA by the agency and thus represent some of the best information available in the central and eastern United States for this regional modeling purpose. We feel that the resulting 'first principal' inventories are of sufficient technical credibility to justify their use in this regional analysis and are consistent with the inventories produced by EPA for the same purpose.

[3] http://www.epa.gov/airtransport/techinfo.html
[4] http://www.eia.gov/oiaf/archive/aeo09/index.html

We then examined the air quality impacts of the emissions prepared for the base year 2008 simulation and examined residual nonattainment in 2014 and 2018. The air quality modeling associated with this task had three primary objectives:

- Perform 2008 baseline and 2014 and 2018 future year modeling exercises with the Comprehensive Air quality Model with extensions (CAMx) v.5.20.1 modeling system setup at 36/12 km scale over the study area for 2008. These simulations shed light on the degree to which current controls and controls considered 'Business As Usual' provide for attainment of the PTR objective NAAQS.
- Use EPA's PTR attainment results with the new information produced for 2014 and 2018 to examine the rate at which residual ozone and PM nonattainment monitors come into attainment as planned federal and local controls begin to take effect in the out-years.
- Identify those areas, if any, for which residual nonattainment of the 8-hour ozone or annual/daily PM NAAQS are simulated in the future years.

In this analysis, we used measurements of ambient ozone and PM 2.5 data from several State and Federal monitoring networks. This includes data from over 500 ozone monitoring sites as well as over 500 Federal Reference Method (FRM) PM2.5 sites in the Eastern U.S. In addition, speciated PM2.5 data from the Chemical Speciation Network (CSN) and IMPROVE network were used to estimate PM2.5 species concentrations at each FRM site. The ambient data used in this analysis were obtained from EPA's Air Quality System (AQS).

The EPA modeling guidance[5] recommends using the average of the three design value periods centered on the year of the base year emissions. Since 2008 was the base emissions year for the our modeling and design values were not yet available to represent the base year using the three design value periods centered on this year (2006-2008, 2007-2009, and 2008-2010), we used an alternate approach recommended by EPA.

An alternate EPA recommended averaging technique assumes that at least five complete years of ambient data is available at each monitor. In some cases there were less than five years of available data (especially at relatively new monitoring sites). In this case EPA recommends that data from the monitor is used if there is at least three consecutive years of data. If there are three years of data then the baseline design value will be based on a single design value.

For ozone, we used the design value period that straddled the baseline inventory year (e.g., the 2007-2009 design value period for our 2008 baseline inventory year). For both annual and 24-hr PM2.5, 2009 design value data were not yet available at the time of our analysis and so a design value period from a three year period which at least contained our base year in its range (2006-2008) was used.

[5] http://www.epa.gov/ttn/scram/guidance/guide/final-03-pm-rh-guidance.pdf

Projection of Future Design Values and Determination of Nonattainment for Ozone and Annual and 24-Hour PM2.5

The EPA notes that the projection methodology for ozone and PM2.5 involves using the model predictions in a relative sense to estimate the change in concentration between 2008 and each future year scenario. For a particular location, the percent change in modeled concentration (the relative response factor (RRF)) is multiplied by the corresponding observed base period ambient concentration (DVb) to estimate the future year design value for that location (DVf).

Consistent with EPA methods of calculating future year design values in the PTR with the Modeled Attainment Test Software (MATS)[6], we generated ozone and PM2.5 future design values and resulting nonattainment predictions using EPA default settings in the software package and with noted differences in design value period years chosen as noted above.

Results

The Modeled Attainment Test Software (MATS) v2.3.1 was used to implement the modeled attainment tests for particulate matter (PM2.5) and ozone (O3) for the air quality simulations conducted in this analysis. An update we made to the public distribution of this model was the inclusion of final 2009 ozone design value data as published by EPA in August 2010. These data were used in the attainment tests conducted for 8-hr ozone in the modeling domain. Most recent data distributed with the noted version of the software were used in the annual and 24-hr PM2.5 attainment tests.

Some of the key attainment findings of this latest study included:

*8-hr Ozone Attainment Demonstration*: Using 8-hr ozone design values calculated from 2007-2009 observational data sets, we found that only three counties in our study area exceeded the objective 1997 8-hr ozone NAAQS of 85 ppb in 2008. Our future year simulations of 2014 and 2018 indicated that all counties and monitors within the study area achieve 8-hr ozone attainment by 2014 and remain in attainment in 2018. From these results, we found that the ozone objectives of the proposed transport rule can be achieved with no new controls beyond BAU no later than 2014.

*Annual PM2.5 Attainment Demonstration*: Our modeling showed that all but nine counties in the study area were in attainment of the annual PM2.5 NAAQS in 2008. From this list, only one county (Allegheny County, PA) was found to remain in nonattainment of the 15.0 µg/m3 annual PM2.5 NAAQS in 2014 (16.6 µg/m3) and 2018 (16.2 µg/m3). From these results, the annual PM2.5 objectives of the proposed transport rule can be achieved with no new controls beyond BAU no later than 2014 with the possible exception of additional local controls at the Allegheny County, PA location. This site has been previously documented to be heavily influenced by emissions from local sources[7].

[6] http://www.epa.gov/scram001/modelingapps_mats.htm

[7] Proposed Revision to the Allegheny County Portion of the Pennsylvania State Implementation Plan. Attainment Demonstration for the Liberty-Clairton PM2.5 Nonattainment Area. Allegheny County Health Department. February 22, 2010.

*24-hr PM2.5 Attainment Demonstration*: Our modeling showed that twenty-one counties in the study area are in nonattainment of the 24-hr PM2.5 NAAQS in 2008. From this list, only two counties (Allegheny County, PA and Brooke County, WV) were found to remain in nonattainment of the 35 µg/m3 24-hr PM2.5 NAAQS in 2014 (51.2 and 38.0 µg/m3, respectively) and in 2018 (50.0 and 37.2 µg/m3, respectively). From these results, the 24-hr PM2.5 objectives of the proposed transport rule can be achieved with no new controls beyond BAU no later than 2014 with the possible exception of additional local controls at the Allegheny County, PA and Brooke County, WV locations.

**Impacts of Updated Design Values on Determinations of Contributions to Nonattainment and Maintenance in the Proposed EPA Transport Rule**

The EPA's Proposed Transport Rule and Cross-State Air Pollution Rule identify link between specific upwind states and downwind ozone or PM2.5 nonattainment areas based on photochemical modeling of the 2005 base year and two future years: 2012 and 2014. Model results for the base and future years are used to compute relative response factors (RRFs) equal to the ratio of predicted future year to corresponding predicted base year design values (DVs). These RRFs are then multiplied by DVs calculated from monitoring data for a base period centered on the 2005 base model year to obtain the predicted future year DV.

Two different base period DVs are calculated from observations: the average of DVs computed from measurements for periods ending 2005, 2006, and 2007 (i.e., average of the three design values for the three attainment periods 2003-2005, 2004-2006, and 2005-2007) and the maximum of these three base period DVs. RRFs and resulting predicted future year DVs were computed by EPA using the Modeled Attainment Test Software (MATS).

EPA's PTR and CSAPR identify two categories of ozone and PM2.5 monitoring sites based on the predicted future year DVs determined from MATS in the above manner:

1. "Nonattainment" sites are those monitoring sites for which the average of the three DVs is projected to exceed the NAAQS in 2012.

2. "Maintenance" sites are those monitoring sites that are not nonattainment sites as in (1) above but the maximum of the three DVs is projected to exceed the NAAQS in 2012.

EPA used source apportionment modeling to determine which states are predicted to contribute an amount in excess of 1% of the level of the NAAQS to ozone or PM2.5 at each downwind nonattainment or maintenance monitoring site defined in the above manner. Emissions from any such states are deemed to produce a "significant" contribution to either nonattainment or maintenance sites, respectively, of the ozone or PM2.5 NAAQS for purposes of the rule. Thus, significant transport couples are defined by EPA based on DVs calculated from observations made during 2003 – 2007. However, in late 2010, EPA released DVs based on observations from two more recent periods: 2006-2008 and 2007-

2009[8]. These more recent DVs reflect reductions in ozone and PM2.5 precursor emissions which have occurred since 2003-2007 and thus a reduction in the number of potential nonattainment and maintenance sites as defined above.

We examined EPA's list of nonattainment and maintenance monitoring sites for 2012 as defined in the PTR to determine which of these sites were actually already in attainment of the NAAQS based on observations from 2006-2009. Sites already in attainment based on these most recent data represent locations where transport from upwind sources is not contributing to nonattainment or maintenance problems. In performing this comparison, we used DVs calculated from annual summary statistics (e.g., annual fourth highest daily maximum 8-hour average ozone concentration) for 2006-2009. In some cases, insufficient data were available from which to compute the annual summary statistic. In these cases, we used procedures for filling in missing data similar to those used by EPA for computing air quality trends[9]. This is a conservative approach within the context of this analysis as DVs based on filled-in data may suggest a monitoring site is a nonattainment or maintenance site whereas MATS does not contain a DV for the monitoring site.

Results

Total counts of nonattainment and maintenance monitoring sites based on EPA's 2012 projections in the PTR versus nonattainment and maintenance sites determined from 2006-2009 data are provided in Table 1. These results show that over 80% of the sites predicted by EPA to be in nonattainment of the ozone or PM2.5 standards in 2012 are already in attainment as of 2009 based on an average of the 2006-2008 and 2007-2009 DVs. Furthermore, over 80% of the PM2.5 2012 maintenance sites and 1/3 of the ozone 2012 maintenance sites are no longer maintenance sites as of 2009. These results indicate that air quality has improved more rapidly than predicted by EPA's PTR modeling.

We examined locations of monitoring sites projected by EPA to be nonattainment in 2012 which were observed to be in attainment as of 2009 based on averaging the 2006-2008 and 2007-2009 DVs. Table 2 lists all counties with such monitoring sites. Similarly, Table 3 lists all counties with monitoring sites projected by EPA to be maintenance in 2012 which were observed to be neither maintenance nor nonattainment as of 2009 based on 2006-2008 and 2007-2009 DVs.

[8] Results presented here are based on EPA's final ozone and PM2.5 design values for 2006-2008, final ozone design values for 2007-2009 and 13 July 2010 draft PM2.5 design values for 2007-2009 (http://epa.gov/airtrends/values.html; http://www.epa.gov/ttn/analysis/dvreview.htm).
[9] http://epa.gov/airtrends/reports.html

**Table 1.** Counts of nonattainment and maintenance sites[10].

| | Ozone | $PM_{2.5}$ (Annual) | $PM_{2.5}$ (24-Hour) |
|---|---|---|---|
| 2012 Nonattainment Sites as predicted by EPA | 11 | 32 | 103 |
| 2012 Maintenance Sites as predicted by EPA | 15 | 16 | 44 |
| 2012 Nonattainment sites already in attainment based on 2006-2009 data | 9 | 27 | 83 |
| 2012 Maintenance sites that are not maintenance or nonattainment sites based on 2006-2009 data | 5 | 13 | 37 |

[10] As determined from list of monitoring sites included in the PTR

**Table 2.** Counties projected by EPA to be nonattainment in 2012 which were observed to be in attainment as of 2009 based on averaging 2006-2008 and 2007-2009 DVs.

| Ozone | | PM (Annual) | | PM (24-Hour) | |
|---|---|---|---|---|---|
| *County* | *State* | *County* | *State* | *County* | *State* |
| E. Baton Rouge | Louisiana | Bibb | Georgia | Jefferson | Alabama |
| Suffolk | New York | Clayton | Georgia | New Haven | Connecticut |
| Brazoria | Texas | Fulton | Georgia | Cook | Illinois |
| Harris | Texas | Cook | Illinois | Madison | Illinois |
| Tarrant | Texas | Madison | Illinois | Saint Clair | Illinois |
| | | Saint Clair | Illinois | Will | Illinois |
| | | Clark | Indiana | Clark | Indiana |
| | | Dubois | Indiana | Dubois | Indiana |
| | | Marion | Indiana | Knox | Indiana |
| | | Jefferson | Kentucky | Lake | Indiana |
| | | Wayne | Michigan | Marion | Indiana |
| | | Butler | Ohio | Tippecanoe | Indiana |
| | | Cuyahoga | Ohio | Vigo | Indiana |
| | | Hamilton | Ohio | Scott | Iowa |
| | | Allegheny | Pennsylvania | Daviess | Kentucky |
| | | Beaver | Pennsylvania | Baltimore (City) | Maryland |
| | | Lancaster | Pennsylvania | Monroe | Michigan |
| | | York | Pennsylvania | Oakland | Michigan |
| | | Cabell | West Virginia | St. Clair | Michigan |
| | | Kanawha | West Virginia | Washtenaw | Michigan |
| | | | | Wayne | Michigan |
| | | | | Saint Charles | Missouri |
| | | | | St. Louis City | Missouri |
| | | | | Hudson | New Jersey |
| | | | | Union | New Jersey |
| | | | | Bronx | New York |
| | | | | New York | New York |
| | | | | Butler | Ohio |
| | | | | Cuyahoga | Ohio |
| | | | | Franklin | Ohio |
| | | | | Hamilton | Ohio |
| | | | | Montgomery | Ohio |
| | | | | Summit | Ohio |
| | | | | Allegheny | Pennsylvania |
| | | | | Beaver | Pennsylvania |
| | | | | Berks | Pennsylvania |
| | | | | Cambria | Pennsylvania |
| | | | | Cumberland | Pennsylvania |
| | | | | Dauphin | Pennsylvania |
| | | | | York | Pennsylvania |
| | | | | Sumner | Tennessee |
| | | | | Dane | Wisconsin |

**Table 3.** Counties projected by EPA to be maintenance in 2012 which were observed to be neither maintenance nor nonattainment as of 2009 based on 2006-2008 and 2007-2009 DVs.

| Ozone | | PM (Annual) | | PM (24-Hour) | |
|---|---|---|---|---|---|
| *County* | *State* | *County* | *State* | *County* | *State* |
| Dallas | Texas | Cook | Illinois | Camden | New Jersey |
| Harris | Texas | Jefferson | Kentucky | Union | New Jersey |
| | | Cuyahoga | Ohio | New York | New York |
| | | Hamilton | Ohio | Cuyahoga | Ohio |
| | | Montgomery | Ohio | Lucas | Ohio |
| | | Stark | Ohio | Mahoning | Ohio |
| | | Berks | Pennsylvania | Preble | Ohio |
| | | Berkeley | West Virginia | Stark | Ohio |
| | | Hancock | West Virginia | Summit | Ohio |
| | | Marion | West Virginia | Trumbull | Ohio |
| | | | | Allegheny | Pennsylvania |
| | | | | Davidson | Tennessee |
| | | | | Brown | Wisconsin |
| | | | | Milwaukee | Wisconsin |
| | | | | Waukesha | Wisconsin |

**Summary and Conclusions**

Our findings confirm that in each region analyzed, all ozone and particulate matter precursor pollutants have decreased since 1999 in aggregate with some demonstrated intermediate year variability typically due to specific year-to-year fire emissions. Additionally, our results show that average 8-hr ozone and both the average annual and 24-hour PM2.5 design values have decreased in all five regions of the continental United States during the ten year period from 1999 through 2009.

Photochemical modeling analyses, including the EPA attainment test, were conducted for three key years: 2008, 2014, and 2018. The modeling for year 2008 served the important function of providing a recent 'typical baseline' year for the purpose of calculating relative response factors (RRFs). Most importantly, moving to 2008 took direct advantage of recent reductions in design values measured across the study area and the use of current emissions inventory data made available from EPA and others which include the controls and related emission reductions that were already occurring in response to CAIR. Results of this work clarify when the effects of 'Business As Usual' state and federal control programs would begin to significantly lower the 8-hr ozone and annual and 24-hr PM2.5 design values at key monitors in the modeling domain.

The SO2 and NOx emission forecast for this analysis ('Business As Usual') assumed compliance with the Clean Air Interstate Rule, as well as utility agreements with regard to Consent Decrees and State programs. The future regional electrical generation by fuel type and regional fuel forecasts that were incorporated into the model were from the Energy Information's Administration's Annual Energy Outlook 2009 (AEO2009) - Updated Reference Case.

Using EPA attainment test software and algorithms with the output from our 'Business As Usual' air quality model simulations for 2008, 2014 and 2018, we concluded that the ozone objectives of the proposed transport rule can be achieved within our study area with no new controls beyond 'Business As Usual' no later than 2014.

We also concluded that the annual PM2.5 objectives of the proposed transport rule can be achieved within our study area with no new controls beyond 'Business As Usual' no later than 2014 with the possible exception of additional local controls at the Allegheny County, PA location.

Additionally, we concluded that the 24-hr PM2.5 objectives of the proposed transport rule can be achieved within our study area with no new controls beyond 'Business As Usual' no later than 2014 with the possible exception of additional local controls at the Allegheny County, PA and Brooke County, WV locations.

Finally, we concluded that that over 80% of the sites predicted by EPA to be in nonattainment of the ozone or PM2.5 standards in 2012 are already in attainment as of 2009 based on an average of the 2006-2008 and 2007-2009 DVs. Furthermore, over 80% of the PM2.5 2012 maintenance sites and 1/3 of the ozone 2012 maintenance sites are no longer maintenance sites as of 2009. These results indicate that air quality has improved more rapidly than predicted by EPA's PTR and CSAPR modeling.

**Gregory Stella**

**Senior Scientist and Managing Partner**

**Alpine Geophysics, LLC**

Mr. Stella is internationally recognized as a technical authority in the planning, design, development, evaluation, application, and modeling of local, national, and international emission inventories and policy options for the projection and control of ozone and particulate matter pollutants and precursors. He has coordinated with Federal, State, Regional, Local, International, Tribal, and private workgroups, modeling centers, and stakeholders to develop, evaluate, and apply alternative control measures and control program designs in support of emissions and air quality analyses.

Prior to joining Alpine in 2003, Mr. Stella was at on staff at EPA's Office of Air Quality Planning and Standards where he managed and prepared the emission inventories, control strategies, and associated temporal, spatial and speciation data for the Regional Transport NOx SIP Call, Section 126 rulemaking, Tier-2 tailpipe standards, 1-hour attainment demonstrations, Heavy-Duty Diesel Engine standards, Multi-Pollutant legislation, Clear Skies Analysis, and US/Canadian Air Quality Agreements. Mr. Stella is a recipient of two U.S. EPA Gold Medals, for the NOx SIP Call Rulemaking (1999) and the Tier-2 Tailpipe Standard (2001) as well as a U.S. Department of Justice Certificate of Commendation for working with the Environment and Natural Resources Division (2000) and multiple Bronze Medals for Commendable Service for projects in which he participated while at EPA.

Mr. Stella received his Bachelors of Science degree in Chemical Engineering from the Johns Hopkins University in Baltimore, Maryland.