

**Technical Minutes of the
U.S. Environmental Protection Agency
Advisory Council on Clean Air Compliance Analysis
and Air Quality Modeling Subcommittee
Teleconference
August 31, 2006
1:00 - 3:00 pm, Eastern Time**

Committee Members: Dr. David Allen
Dr. David Chock
Dr. Paulette Middleton
Dr. Jim Price
Dr. Ted Russell
Dr. Chris Walcek
Dr. Trudy Cameron
Dr. Wayne Gray
Dr. V. Kerry Smith
Dr. Katherine Kiel
Dr. James K. Hammitt
Mr. Ralph Morris
Dr. Dallas Burtraw
Dr. Alan Hansen (was unable to participate in the teleconference but submitted written comments)

Date and Time: 1:00pm 3:00pm, August 31, 2006

Purpose: To provide advice on an interim method of forecasting emissions as described in *Improving EPA Emissions Forecasting For Regulatory Impact Analyses* posted at <http://www.epa.gov/ttn/ecas/articles.html>

SAB Staff: Dr. Holly Stallworth, Designated Federal Officer

Other EPA Staff: Ron Evans, Linda Chappell, Doug Solomon, Keith Sargent, Brian Hubbell, Peter Nagelhouse, Cynthia Morgan, Ron Shadbegian, Brian Heninger, Nathalie Simon, Al McGartland, Lydia Wegman

Other: Stuart Sessions, Environomics
Jim Neumann, Industrial Economics
Jayson Price, Industrial Economics
Jim Wilson, Pechan Associates

Andy Bowman, Pechan Associates
Rebecca King, Ford Motor Company
Attachment A: Agenda
Attachment B: Comments from Stuart Sessions,
Environomics

Attachments:

Meeting Summary

The discussion followed the issues and general timing as presented in the meeting agenda shown in Attachment A. Dr. Stallworth convened the meeting and explained the Advisory Council on Clean Air Compliance Analysis (Council) and its Air Quality Modeling Subcommittee (AQMS) operate under the Federal Advisory Committee Act. Dr. Allen reviewed the agenda and called members attention to the specific charge question in the review document referenced above. The floor was then given to Mr. Doug Solomon, Group Leader for the Emissions Inventory and Analysis Group of EPA Office of Air Quality Planning and Standards (OAQPS) to provide background for this advisory request. Following Mr. Solomon overview, members discussed several issues and requested clarifications on some points. Mr. Stuart Sessions, a consultant with Environomics, Inc., on behalf of a group of industrial trade associations, provided comments as captured in his written statement shown as Attachment B. Members of the Council and AQMS then resumed discussion of the topic, with a number of members offering variations of ideas for how OAQPS might proceed. Plans were made for developing the technical minutes that follow.

The following is offered as background for this deliberation.

Background:

EPA has been working on the regulatory impact analysis (RIA) for issuance of a particulate matter (PM) standard under the National Ambient Air Quality Standards (NAAQS) program administered by OAQPS. Although the immediate advisory need stems from this particular NAAQS standard, there is a need for improvements in emissions forecasts for a number of regulatory analyses. This forthcoming PM NAAQS standard is the first major regulation since 1997 that affects a diverse and large number of sources nationwide (whereas most other post-97 air regulations have targeted a specific type of source). This has raised new issues in forecasting future emissions in the stationary non-EGU (non electricity generating unit) sector. EPA does not yet have a sophisticated analytic tool to capture emissions in this sector. In response to this challenge, OAQPS has devised an interim method for forecasting emissions for stationary non-EGU sources.(This non-EGU sector includes industrial boilers, refineries, commercial and institutional and residential fuel use, chemical manufacturers, and does not include mobile sources or electricity generating units.)

EPA typical approach for forecasting emissions in the non-EGU sector is a simple 3 factor equation capturing the following:

1. current or base year emissions (developed with models and observations)
2. growth factors (reflecting economic or activity changes in that industry for that geographic region) and
3. an emissions control adjustment (reflecting regulatory requirements).

But this equation has overestimated future emissions in the non-EGU sector, hence improvements are needed. EPA suspects the reasons for the discrepancy between predicted and actual emissions is due to the simplifying assumption of a linear relationship with a coefficient of 1 between economic growth and emissions. This assumption implied an emissions rate per unit of economic activity that was constant over time, a problematic assumption. In addition, EPA emissions control factors (as captured in #3 above) are based on old tests. To better align forecasts with actual emissions, the proposed interim approach takes the economic growth term out of the forecasting equation altogether.

Summary of Comments and Recommendations:

The deliberative panel was compromised of both Council and AQMS members (all listed above) This summary reflects written comments provided by Dr. Alan Hansen and oral comments provided by the convened members for its teleconference of August 31, 2006. The following recommendations reflect areas where the panel generally agreed, with additional details embellishing on the overall consensus.

After establishing that both EPA historical and interim approach to forecasting non-EGU emissions does not account for endogenous technological change (like improvements in the efficiency of production processes or better pollution control technologies), the Committee agreed unanimously on the need to develop some crude estimates to capture this underlying endogenous technological change. This inability to capture endogenous technological change was readily acknowledged as a problem by EPA-OAQPS. While EPA may be expert at developing coefficients for the impact of regulatory requirements, EPA is unable to predict technological improvements in the non-EGU sector, hence there is a discrepancy between actual emissions and predicted emissions in this sector. In response to this discrepancy, the Committee generally agreed that the interim approach of dropping the economic growth factor would not be perceived as credible because the underlying downward trends in emissions would remain unexplained. Rather than setting the effects of economic growth to zero, it is better to seek approximations that represent the underlying endogenous technological change reflecting efficiency improvements. Even if done rather quickly and crudely, developing simple proxies for endogenous technological change is preferable to simply dropping the economic growth factor from the forecasting equation.

The following five points reflect the Committee discussion and recommendations in response to the Agency charge. Of these five points, the first is the most important.

- *Develop adjustments for emissions factors consistent with the changes observed in the 1990.* This approach would utilize historical trends in emissions from non-EGU industries (as found in data from the National Emissions Inventory for the 1990's) and estimate the declining emissions intensity as it relates to economic growth. Because the non-EGU sector was subject to Clean Air Act rules in the 1990's, it would be important to first separate out the effects of these regulations, disaggregating the portion that resulted from regulation from the non-regulatory component. After factoring out the portion attributable to regulation, the remaining decline in emissions intensity could be interpreted as the non-regulatory portion attributed to technological change. As a default assumption, this historical decline in emissions intensity could be assumed to continue at a constant rate in future years. Estimating a declining emissions intensity could be done in the aggregate or with selected industries. The forecasting equation would keep the economic growth factor but would include this approximation for a forecast of declining emissions intensity.
- *Improve documentation.* The Committee suggests that EPA explicitly document the origins of the emissions inventory, explaining the extent to which the emissions are based on actual observations or engineering calculations. This would add credibility to the regulatory impact analysis and assist the reader in understanding the analytic challenge with respect to forecasting future emissions.
- *Utilize forecasts of fuel type.* One way to mitigate EPA deficiency in capturing endogenous technological change is to utilize forecasts of fuel types (to which emissions factors are applied). An example of this is a switch to lower sulfur crude that may occur when a refinery is subject to tighter sulfur controls. Since emissions are highly sensitive to fuel type, any effort to capture predicted changes in fuel type would at least partially capture the underlying technological change driving the historic and anticipated decline in emissions.
- *Utilize differences between attainment and non-attainment areas.* Another potential improvement would be to capture the differences in emissions reductions in non-attainment areas versus attainment areas. Greater reductions can be expected from those areas in non-attainment and/or in those regions of the country pursuing more stringent controls. Applying this expected difference could improve forecasts.
- *Clarify what research is needed for long term improvements in forecasting.* To better forecast emissions in the non-EGU sector in the long term, EPA should clarify the nature of the more detailed industry-specific studies that would yield better emissions factors. One way to prioritize the selection of industries for case

studies is to consider the size of emissions in different industries or regions, giving preference to those industries or regions with greater emissions. Any longer term improvement in emissions forecasting will include appropriate sensitivity analyses and bounding of uncertainty.

The above recommendations are offered in recognition that forecasting emissions is a complex process involving many challenges even in an unconstrained world without time or resource limits. The Committee recognizes that OAQPS is operating under severe time constraints for issuing a regulatory impact analysis for a forthcoming PM NAAQS regulation and that these constraints will necessarily determine the nature and extent of any improvements in forecasting non-EGU emissions into the future. However it is the Committee hope that at least some of these suggestions could provide the basis for a short term improvement in EPA capability for forecasting future emissions.

On Behalf of the Panel,
Respectfully Submitted,

Holly Stallworth, Ph.D. /s/
Designated Federal Officer

Certified as True:

David T. Allen, Ph.D. /s/
Chair, Air Quality Modeling Subcommittee