July 30, 2008

MEMORANDUM

SUBJECT: Region 6 Comments on Draft Final Revisions to the Refinements of Increment Modeling Procedures

FROM: Carl E. Edlund, P.E.
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Region 6 Multimedia Planning and Permitting Division (6PD)

TO: Cheryl Newton
Acting Director
Region 5 Air and Radiation Division

This memorandum provides EPA Region 6's input on the draft final revisions to the Refinements of Increment Modeling Procedures rule, proposed on June 6, 2007 (72 FR 31372). You requested that the EPA Regions provide you input on our position on the final rulemaking package.

EPA Region 6 believes that our comments submitted on December 11, 2006, and included as an attachment to this memorandum, remain important considerations in the final deliberation on this rulemaking and have not been adequately addressed during the final rule development process. Our main concern continues to be that this action allows short-term emission rates to be estimated from annualized average emission rates. This estimation will result in a significant underprediction of the actual impact and lead to worsening air quality. Additionally, we note that this draft final rulemaking is inconsistent with the July 6, 2006, Regional Haze and Best Available Retrofit Technology rulemaking (70 FR 39119), in which EPA opined that use of annual averages could lead to underprediction of actual impacts.

Should you have any questions regarding our position, please feel free to contact me at 214-665-7200, or you may contact Jeff Robinson of my staff at 214-665-6435.

Enclosure

**Annual Average Emissions for Short-Term Impacts**

Our foremost concern is the use of annual emissions to determine short-term emission rates for use in modeling. In EPA Region 6, as with many other areas of the country, short-term standards/increments are the ones most likely to be exceeded. While the requirements of the calculation and use of short-term emission rates delineated under Tables 9-1 and 9-2 of 40 CFR 51, Appendix W (Guideline on Air Quality Models) may not directly apply to the periodic increments review requirements established pursuant to 40 CFR 51.166, as a matter of common practice, procedures for calculating short-term rates typically have not varied between NAAQS and increment demonstrations. Furthermore, even though the 1990 DRAFT NSR Workshop Manual was never finalized, it outlined procedures for increment analysis consistent with the NAAQS analysis outlined in the Federal Register that has been followed by our Region and our states. Thus, within the regulatory modeling community it has been the practice to use short-term emission estimates in modeling analyses for pollutants with short-term averaging periods (e.g., 24 hours). We have given guidance to our states to follow these procedures to protect the standards and our states have historically followed these procedures. To change the guidance would undermine many of the permits issued in our Region. From our experience, the use of annual averaged emissions is often significantly different for many industrial emissions, including coal burning power plants and the resultant impacts of annual averaged values would not be protective of short-term increments. It has also been our experience that short-term increment issues have driven the level of controls for some facilities and resulted in overall less emissions from a project. This affect would be weakened by the use of an annual average emission rate.

Therefore, Region 6 believes that maximum actual short-term emissions should be used to evaluate short-term PSD increments, because this procedure results in protecting increment standards.

The proposal states (page 71) that the derivation of short term emission rates from longer term averages is acceptable to EPA.[1]

> "...The derivation of a short-term emission rate from an average of actual emissions is different exercise than what is covered in this part of the Guideline on Air Quality Models. EPA continues to consider it inappropriate to convert long term concentration averages to short term concentration averages. However, for the reasons set forth above, the conversion of an annual emission rate into a short-term emission rate through averaging is acceptable to EPA when determining the emissions of multiple sources that affect the baseline and consume increment."

[1] We note that this specific language from page 71 of the pre-proposal draft provided for Regional Office review on November 13, 2006, does not appear in the draft final rulemaking package provided for Regional Office review on July 17, 2008. The fundamental concept of using annual average emission rates to estimate short-term emission rates remains in the draft final rulemaking package and can be found at pages 28-36 and in the draft regulatory revisions to 40 CFR 51.166(f)(1)(iii) and 52.21(f)(1)(iii). We note that our concerns were not addressed either in the June 6, 2007 proposed rulemaking or in the July 17, 2008 draft final rulemaking.

The process of annualizing short term emission rates functions is an equivalent procedure to the transformation of long term to short term concentration averages by application of a scaling factor. Most EPA approved near-field dispersion models (ISC, AERMOD) use variants of a Gaussian equation. The Gaussian equation varies concentration predicted directly with the emission rate modeled in a linear fashion. Therefore, when the emission rate is scaled up or down, the concentration is also scaled up or down proportionally. The proposed changes would function as a concentration scalar, transforming the long-term concentration to short-term which has been prohibited by modeling procedures historically.

In most source categories with variable operation rates, it is entirely reasonable to assume higher operation levels than the level represented by the annual average. According to 70 FR 39129 (Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations) (July 6, 2006), during peak operating periods, the 24-hour actual emission rate can be more than double the long-term daily average. By annualizing a short-term emission rate, the assumption is then being made that the annualized rate is representative of normal short-term source operations. The fact that higher source operation levels are likely to exist is neglected, which will result in underestimation of short-term concentrations.

In order to demonstrate this effect of annualized short-term emission rates upon short-term concentrations, Region 7 has used one of the developmental datasets of the AERMOD from the Kinkaid database available on EPA's Support Center for Air Quality Modeling Website (http://www.epa.gov/scram001). In order to perform a simple demonstration of the effect of annualized emission rates, they transformed the short-term emission rate to a "long-term average" by reducing the hourly emission rate by a factor of 2 (representing the idea that a short-term actual emission rate can be double that of the long-term average according to the logic of 70 FR 39129).

Region 7's results indicated that the process of annualizing a short-term emission rate will almost always mask a short term concentration peak and will usually result in a bias towards underprediction of design concentrations.

Furthermore, since the form of short-term increments are deterministic (40 CFR 51 Appendix W, Section 7.2.1.1 (a)) (e.g. usually not be exceeded more than one time per year) as opposed to statistically based such as the $PM_{10}$ NAAQS, the design concentration is based upon the "highest, second high short term concentration for each year modeled." Therefore, use of long-term averages for establishing short term emission rates is inconsistent with EPA modeling regulation (Section 7.2.1 of GAQM) and the approach for determining compliance with short-term standards because the design concentration will not be based upon the highest, second high concentration, but in fact will be based upon the design concentration which is representative of the longer term average.

Finally, we wish to call attention to the fact that EPA has already stated in the public record that modeling annual averages for 24-hour values may result in underestimation of impacts. In rule making for BART (7/6/2006), the EPA stated that use of annualized emission rates likely underestimates short-term impacts. In the Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations, EPA opined that the use of an annualized emission rate potentially underestimate visibility impacts. According to 70 FR 39119, features of the modeling examples which may understate visibility impacts include:

- **An annual emission rate was used for the example modeling (e.g. 10,000 TPY divided by 365 days divided by 24 hours). ``Real world'' sources have variable emission rates, and in any 24 hour period may be operating well above the annual rate.**
- The monthly average relative humidity was used, rather than the daily average humidity, and would contribute to lowering the peak values in daily model averages.
- A 24-hour average was calculated from modeled hourly visibility impacts, reducing the impact of any one particular hour that could be higher due to a number of meteorological effects.

In conclusion, we strongly believe that emission rates for short-term increments should be representative of maximum actual conditions consistent with the approach outlined in the Regional Haze Regulations and Guidelines for Best Available Retrofit Technology (BART) Determinations Federal Register notice (7/6/2006). The maximum 24-hour actual emission rate, excluding periods of startup, shutdown, or malfunction, are more representative of steady-state conditions during periods of high capacity utilization which the short-term increments are intended to protect.