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RTP Reporter

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Compliance Assurance Monitoring (CAM) Revisited

by Gary Nelson

After an extended period of development and significant changes, the Compliance Assurance Monitoring (CAM) regulation (initially proposed in September 1993 as the "enhanced monitoring rule") was finally promulgated on November 21, 1997. Due to the significant input from the public during the development of the rule, the scope of applicability of the rule was greatly narrowed and the implementation schedule was generally delayed until the renewal of a facility's Title V permit. Consequently, until recently, there has been relatively little interest or concern about this rule by most facilities. With the renewal of the Title V permits well underway in most states, many facility operators have, or should have, taken another look at this regulation to see if it could apply to their facility, since each required CAM plan must be submitted as part of the Title V renewal permit application.

One of the most confusing parts of this regulation is determining whether it applies to an emissions unit at a facility. This article summarizes an approach for determining the applicability of the CAM rule to emissions units at a facility.

Answering the following series of questions will assist in determining whether the CAM rule applies:

1. Is the facility required to obtain a Title V (Part 70) Permit?
2. Does the emissions unit use a control device to achieve compliance with an emission limit or standard?
3. Is the emissions unit subject to an emission limit or standard that is federally enforceable?
4. Does the emissions unit have potential pre-controlled emissions of the regulated air pollutant greater than the major source threshold?

If the answer to any of these four questions is NO, then CAM will not apply to the emissions unit. Questions 2 through 4 should be asked on a pollutant-specific basis. For example, CAM may apply for particulate matter emissions but not for other pollutants emitted from the unit.

While there is an extensive definition of a "control device" in the regulations which lists the commonly used add-on control devices, the definition may not be as straightforward as it would seem. For example, flue gas recirculation is a control device but staged combustion and low NO_x burners are not.

The major source thresholds referred to in question 4 are 100 tons per year for criteria pollutants (lower if a nonattainment major), 25 tons per year for an aggregate of hazardous air pollutants (HAP), and 10 tons per year of an individual HAP.

If the answer to all four of the above questions is YES, then an evaluation should be made as to whether any exemptions from CAM would apply. Emissions units subject to the following emission limitations or standards are specifically exempt from the monitoring requirements of the CAM rule:

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- New Source Performance Standards (NSPS - 40 CFR 60) and National Emission Standards for Hazardous Air Pollutants (NESHAP - 40 CFR 61 and 63) proposed after November 15, 1990
- Stratospheric ozone protection requirements
- Acid rain program requirements
- Emission limits, standards or other requirements that apply solely under an approved emission trading program
- Emission caps that meet the requirements of 40 CFR 70.4(b)(12)
- Emission limits or standards for which a Title V permit specifies a continuous compliance determination method, as defined in the CAM rule

These exemptions also apply on a pollutant-specific basis (i.e.; if an applicable NSPS proposed after November 15, 1990 specifies a particulate matter emissions limit, the unit is exempt from CAM for particulate matter, but not for other pollutants emitted from the unit). There is also an exemption for backup utility power units that meet certain criteria.

Finally, the rule contains two schedules for implementation. For "large" units (post-control potential to emit above the major source thresholds), at a facility with a Title V permit, the CAM plan is required when a significant permit modification is submitted. Otherwise, a plan is required when the Title V renewal application is submitted.

Our experience with the CAM rule has shown that the number of emissions units requiring a CAM plan is relatively small. However, failure to submit the plan in conjunction with the renewal Title V permit application can have serious implications. Determining the need for a CAM plan should be made well in advance of submitting a renewal Title V permit application. Because of the complexity of determining the applicability of the CAM rule, we suggest a discussion with the regulatory agency to confirm the CAM requirements.

If a CAM plan is needed, there are a number of guidance documents that can be used to assist in preparing the plan. The monitoring provisions contained in the large number of MACT rules that have been issued can often be used to develop the basic framework of a CAM plan for a similar type of emissions unit. Many state agencies have prepared forms or checklists that can be used to address the CAM requirements.

CAM Plan Elements

Background

Identification of the emissions unit, applicable regulatory requirements, and a description of the control technology used.

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Advanced New Source Review Workshop 2004-2005
Gary McCutchen, Instructor

Albuquerque, New Mexico ..... September 20-24, 2004
Orlando, Florida ..... October 11-15, 2004
Las Vegas, Nevada ..... April 18-22, 2005
New Orleans, Louisiana ..... September 12-16, 2005

Monitoring Approach and Justification

A discussion of how compliance can be assured using performance indicators and maintaining operations within the selected indicator range. This element should also discuss the performance criteria for the monitoring system such as data representativeness, verification of operational status, Quality Assurance/Quality Control practices, monitoring frequency and data collection procedures.

Indicator Range Justification

This element should include compliance test data, data supporting the indicator ranges selected, and the rationale and documentation for these ranges.

The keys to preparing the CAM plan are to keep it as simple as possible and to have a sufficient amount of valid data on which to base the selection of the indicator ranges.

If you would like further information on this subject, we would be pleased to discuss this with you.

About the Author - Gary K. Nelson, P.E.

Gary Nelson **is a Senior Consultant in RTP's South Carolina office. He holds undergraduate and graduate level degrees in engineering and is a registered professional engineer. Gary has over 25 years of environmental engineering experience, with a special emphasis in air permitting, regulatory compliance, and strategic environmental planning. He has worked in industry and served for seven years as a manager of air permitting at a state regulatory agency.**

AERMOD Looming

by Richard Madura

On April 21, 2000 the U.S. Environmental Protection Agency proposed changes to the Guideline on Air Quality Models (40 CFR Part 51 Appendix W) incorporating the AMS/EPA Regulatory MODel (AERMOD) for short range dispersion modeling (distances up to approximately 50 km) and CALPUFF for long range dispersion modeling (65FR21506) in place of the Industrial Source Complex Short Term model (ISCST) for air quality assessments. On April 15, 2003, the USEPA finalized the use of CALPUFF (68FR18439), but deferred the implementation of AERMOD pending further modifications. On September 8, 2003, the USEPA published a Notice of Data Availability in the Federal Register (68FR52934) to provide additional support documentation for the use of AERMOD. At the time of this article, no final rule establishing AERMOD as the regulatory model has been published, although promulgation is expected in the near future. Upon promulgation, state and local regulators will have one year to incorporate AERMOD into their modeling programs.

AERMOD Development

The development of AERMOD began in 1991 when American Meteorological Society (AMS)/EPA Regulatory Model Improvement Committee (AERMIC) was established to further the development of a new regulatory model incorporating the latest scientific advances to replace the long-standing ISCST model. Like ISCST, AERMOD is a steady-state Gaussian plume model. However, several significant differences exist between the two models. The most noticeable difference to a modeler is that AERMOD incorporates two preprocessors to incorporate surface terrain (AERMAP), which incorporates Digital Elevation Model (DEM) data, and meteorological data (AERMET), which, like ISCST, incorporates surface and upper air data. Other differences include:

- the incorporation of the Plume RIse Model Enhancements (PRIME) downwash algorithm for building downwash;
- use of BPIP-PRIME in place of BPIP for development of building downwash parameters (including two new parameters);
- use of multiple levels of meteorological data to account for varying stack and plume heights, and variability in meteorological parameters in the vertical direction;
- use of land use of Land Use/Land Cover (LULC) data for preprocessing of meteorological data;
- changes in the URBAN/RURAL methodology allowing for treatment of individual sources and land areas;
- incorporation of several surface parameters (albedo, Bowen ratio, surface roughness) for terrain preprocessing in place of the URBAN/RURAL modeling option;
- changes in mixed layer height treatment; and
- changes in the treatment of plume growth and plume interaction with the mixing lid.

AERMOD Performance

RTP's Louisiana office is involved in the Louisiana Department of Environmental Quality's AERMOD Modeling Guideline Workgroup, established to evaluate differ-

ences between ISCST and AERMOD in the Louisiana domain and develop a preliminary modeling guideline document for presentation to stakeholders prior to finalization of the State Modeling Guideline, and RTP presented a case study for a coastal wetland site to the group. Two significant aspects resulting from the use of AERMOD are of note. First, in addition to time required to evaluate land use and land classification and to prepare and run the AERMAP and AERMET preprocessors, AERMOD runs are significantly longer than ISCST runs. Model runs in the range of two to three hours in ISCST can take twice as long or more (runs in the RTP case study with a domain the size of one used in a small PSD air quality analysis took approximately 24 hours on a 3.2 GHz Pentium 5 computer), dependent upon the size of the domain, the number of sources, and complexity of the modeled terrain. Second, model results are highly dependent on the surface parameters selected. AERMOD is capable of incorporating seasonal or monthly surface parameters for specific locations in the modeling domain, and locations with low surface roughness, such as open water or marsh land, were found to have significantly higher concentrations than locations with higher surface roughness. Since the model results were found to be very sensitive to surface roughness but only slightly sensitive to albedo and Bowen ratio, great care should be taken in selection of surface roughness(es) in a modeling project. However, high variability in the all surface roughness parameters exists, dependent upon land use/land classification, so careful attention should be paid to the incorporation of the parameters dependent upon the terrain and season.

The executable beta versions of the AERMOD suite (AERMOD, AERMAP, and AERMET) and BPIP-Prime along with user documentation, source code, and test cases are available on the USEPA SCRAM website **(http://www.epa.gov/scram001/)**.

About the Author - Richard L. Madura

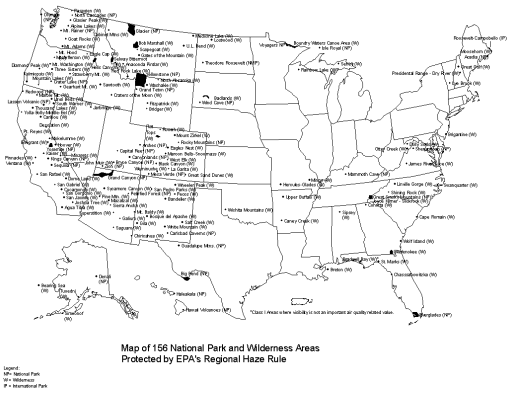
Rick Madura **is a Project Manager and principal air quality modeler with RTP's Louisiana office. He has performed numerous air quality assessments for a variety of applications, including Prevention of Significant Deterioration, air toxics, and HVL release modeling for the pipeline industry. Rick provides a variety of air, water, and hazardous waste services including program applicability, permitting, emergency response planning, and regulatory compliance.**

What About Bart?

Implementing the Regional Haze Rule

by Cheri Buehring

The Regional Haze Rule[1] establishes regulations to protect visibility in 156 scenic areas throughout the U.S. These areas include national parks and wilderness areas, such as the Grand Canyon, Yellowstone, the Everglades and the Great Smoky Mountains (see map at **http://www.epa.gov/ttn/oarpg/t1/fr_notices/classimp.gif**). Under the regulations set forth in the regional haze rule, certain older large facilities must install the best available retrofit technology (BART) to reduce their emissions of pollutants that impair visibility in the scenic areas.



Map of 156 National Park and Wilderness Areas Protected by EPA's Regional Haze Rule

The requirement to implement BART applies to facilities that fall into one or more of 26 source categories that have the potential to emit more than 250 tons per year of visibility-impairing pollutants and were constructed between 1962 and 1977. Most, if not all, of these facilities have been "grandfathered", or exempt from other control regulations due to their age.

The regulation defines visibility-impairing pollutants as ammonia, NO_x, PM_{10}, SO_2 and VOCs. States are required to set periodic goals for visibility improvements, with SIP plan revisions for most states due in 2008. In order to meet this date, the states must identify BART applicable facilities by 2003 to 2005 (depending upon their location). Some states are already contacting facilities to determine which sources will have to implement BART controls.

In July 2001[2], EPA proposed guidelines for BART determinations under the regional haze rule. These guidelines do not set federal emission limits for BART sources, but gives the states guidance when considering BART controls, such as cost, energy requirements and useful life of the equipment. They also explain, in more detail, how to identify facilities and equipment subject to a BART analysis, and certain circumstances under which a source may avoid a BART review.

Facilities should carefully review any equipment constructed during the BART applicable period (1962-1977). There are three specific criteria that the facility must review to determine if a source is subject to BART. Before a source is identified as subject to the BART requirements, the facility must first fall into one of the 26 listed source categories (these are the categories listed in 40 CFR 52.21 - the same list used for PSD and CAA). In some cases, operations at a facility may fall into more than one of the listed categories, and there may also be equipment or processes that are not listed. Only **listed source category equipment** should be considered. Next, the facility must determine the start up dates of the subject equipment. The units potentially subject to BART must have been in existence on August 7, 1977, but not in operation before August 7, 1962. If the units were in operation before 1962, but were reconstructed (as defined in 40 CFR 60, NSPS) during the 15 year period, then that unit is BART eligible. Likewise, if the unit was put in operation between August 7, 1962 and

August 7, 1977, but was reconstructed after 1977, the unit is not subject to BART. Finally, the BART eligible sources at a facility must have the potential to emit more than 250 tons per year of any single visibility-impairing pollutant.

If a facility has equipment that meets these three criteria, then a BART analysis is required for each visibility-impairing pollutant emitted by that equipment. For example, the collection of equipment at a facility that falls within the 26 source categories, and was put into operation during the 15 year time-frame, emits 500 TPY of PM_{10}, 150 TPY of SO_2 and 50 TPY of NO_x. This facility will be required to perform a BART analysis for PM_{10}, SO_2 and NO_x, even though the SO_2 and NO_x emissions are not over the 250 ton per year threshold.

Once the facility has determined that they have one or more BART sources, a BART analysis is required for each visibility-impairing pollutant emitted. EPA has defined this analysis in the BART guidance document as a two step process. First an engineering analysis that identifies the Best Available Retrofit Technology, which is defined as:

> **"*Best Available Retrofit Technology (BART)* means an emission limitation based on the degree of reduction achievable through the application of the best system of continuous emission reduction for each pollutant which is emitted by a BART-eligible source. The emission limitation must be established, on a case-by-case basis, taking into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology."**

The July 2001 proposed guidelines for BART determinations have detailed procedures for the engineering analysis. The second step in the BART determination is a visibility impact analysis to determine the degree of improvement in visibility in the regional Class I areas. Newly proposed changes to the Regional Haze Rule and BART (69 FR 25184-25232, May 5, 2004) gives the states much broader control over determining which BART-eligible sources may cause or contribute to visibility impairment. The original proposed rule from 2001 stated that:

> ***"A State should find that a BART-eligible source is "reasonably anticipated to cause or contribute" to regional haze if it can be shown that the source emits pollutants within a geographic area from which pollutants can be emitted and transported downwind to a Class I area."***

Under the new proposal, a State has the discretion to consider that all BART-eligible sources within the State are "*reasonably anticipated to cause or contribute*" to some degree of visibility impairment in a Class I area.

The newly proposed rule also outlines modeling methodology to evaluate the visibility improvement from each source using the CALPUFF model. Sources would be required to average the 20% worst days for their current allowable emissions and the post control emissions. The difference is the degree of visibility improvement.

Public comment on the newly proposed rule is due by July 6, 2004.

What Will BART Cost?

In a Regulatory Impact Analysis of the BART element of the Regional Haze Rule[3],

the estimates range from $54 million (for the lowest required visibility improvement,with substantial emission trading allowance) to $434 million for the most stringent improvements and no adjustment for emission trading. These numbers are based on 1990 dollars.

While BART is predicted to be costly, the BART limitations will not be fully implemented until the first milestone year in the Regional Haze Rule, which is expected to be 2018.

Footnotes:

[1] Regional Haze Rule; 64 FR p. 35714, 7/1/99

[2] Proposed Guidelines for BART Determinations; 66 FR p. 38108, 7/20/01

[3] www.epa.gov/ttncaaa1/t1/reports/rh06ria.pdf

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