Development of Maximum Achievable Control Technology Standards

#6100140

DEVELOPMENT OF MACT STANDARDS

This report presents the results of an audit by the Office of Inspector General on the development of Maximum Achievable Control Technology (MACT) standards. MACT standards are performance criteria designed to significantly reduce air toxics emissions.

SCOPE AND METHODOLOGY

The audit objectives were to identify efficiencies that could be implemented to accelerate the MACT standards development process, and to evaluate the Agency's method of determining the MACT floor for emission standards. To achieve these objectives, we reviewed available records for the MACT development process. We also interviewed Agency personnel, State officials and other interested parties. We conducted our review activities from October 1994 to August 1995, and performed the audit in accordance with the **Government Auditing Standards** issued by the Comptroller General of the United States (1994 Revision).

We did not verify data from any management information system and did not perform a comprehensive evaluation of internal controls. However, in March 1995, the General Accounting Office (GAO) addressed internal controls in a report on **Clean Air Rulemaking** which concluded that EPA did not have a systematic way of measuring the impact of its efforts to reduce the time it takes to issue rules. GAO recommended that EPA implement a tracking system to record key dates, resources, and historical information needed to monitor and evaluate the Agency's clean air rulemaking process. In response to the GAO report, OAR plans to develop a new resource management system. We agree that a tracking system would assist management in identifying problem areas in the rulemaking process and assessing their streamlining efforts. No other significant issues came to our attention that warranted expanding the scope of our audit.

BACKGROUND

One of the most extensive revisions in the Clean Air Act Amendments (CAAA) of 1990 addressed the Air Toxics Program. Air toxics are those pollutants known or suspected of causing cancer or other serious health effects. Prior to passage of the 1990 Amendments, the air toxics program was at a standstill. Since 1970, the Environmental Protection Agency (EPA) had regulated only eight of the hundreds of toxic air pollutants emitted from industrial processes. The problem under the 1970 law was that EPA was required to regulate air toxics based on **risk** to public health. In setting control standards, EPA was to prevent adverse health effects associated with exposure to air toxics "with an ample margin of safety." Since EPA could not clearly define a safe level of exposure to these cancer-causing pollutants, it became almost impossible to issue regulations.

The 1990 Amendments reflected a different approach for regulating air toxics. EPA was to identify categories of major sources that emit any of the 189 toxic air pollutants listed in the Act. A major source is one that emits more than 10 tons per year of a single air toxic or 25 tons per year of any combination of air toxics. The CAAA also required EPA to establish a separate category to cover air toxic emissions from research or laboratory facilities. In July 1992, EPA published a list of 174 source categories which included 166 major source categories and 8 area source categories (any source not considered a major source). Over the next 10 years, EPA was to develop **technology-based** MACT standards for these categories. These standards require emitters to use the best control technologies already demonstrated by industry sources. The new air toxics program did not

dictate the specific equipment that a facility must install, but rather focused on the emissions standards that the facility must achieve. This approach allowed industry the flexibility to develop its own methods of reducing air toxics emissions.

The CAAA set forth the basic methodology by which these standards were to be developed. The methodology required the Agency to determine the emissions reductions of the various sources and then average the top 12 percent to establish what is commonly referred to as the MACT floor or emission limitation. There is an exception for small industries. If a source category has less than 30 sources, the best five performing sources are averaged to arrive at the MACT floor. To determine the MACT floor, EPA ranks the existing sources in each source category using emission reduction data gathered from questionnaires and other sources. The agency averages the best 12 percent of emission reductions from the ranking list to arrive at the MACT floor.

EMISSIONS FROM MAJOR SOURCES AT RESEARCH AND DEVELOPMENT FACILITIES LACK REGULATION

Section 112(c)(7) of the Clean Air Act requires EPA to establish a separate category to cover air toxic emissions from research or laboratory facilities whose primary purpose is to conduct Research and Development (R&D) into new processes and products. During our review of the MACT standards development process, we learned that a separate category did not exist. As a result, R&D facilities can operate without restriction in those states that have no independent regulation. Of nine completed MACT standards, five explicitly exempted R&D facilities and four were silent.

R&D operations involve not just research in laboratories but full-scale production facilities. R&D production facilities operate for extended periods of time and can be major emitters of air pollution. An EPA official told us that some R&D facilities manufacture large quantities of products for sale as test products and that it is not clear when an operation crosses the line between R&D and manufacturing. In our opinion, the possibility exists that with no air toxics controls required for R&D, industry could take advantage of R&D status to avoid complying with air toxics regulations.

Our discussions with Agency officials revealed that little is known regarding the number of major R&D facilities that exist nor the emissions produced by these facilities. However, no effort was under way to include R&D facilities as a separate category. As a result, we could not determine how many major source R&D facilities exist. In one MACT we reviewed, an industry spokesperson told us his company has a sizeable R&D facility in a metropolitan area. The state environmental official said that the R&D facility is a major source emitter which she believes should be regulated. In another MACT we reviewed, a state official said they do not keep records of major sources of air toxics at R&D facilities. However, he was able to list at least 24 R&D facilities that he believed were major sources of Volatile Organic Compounds (VOCs). The VOCs were Criteria Air Pollutants which are regulated under Title I of the CAAA. An EPA official believes it is likely that major quantities of air toxics are emitted along with the VOC emissions. In that case, those R&D facilities could potentially meet the criteria for major sources of air toxics and be excluded from federal regulations.

Conclusion

From our review of the law, we concluded that the CAAA intended that R&D facilities be categorized as a separate category. However, from our discussions with Agency representatives and other stakeholders, we learned that R&D facilities are not currently subject to MACT standards and that no separate category for R&D facilities now exists. We believe one solution for covering unregulated R&D facilities would be to create a separate category for R&D facilities.

Recommendation

We recommend that the Director, OAQPS, establish a separate category covering research or laboratory facilities.

MACT STANDARDS DEVELOPMENT

One of the objectives of this review was to identify efficiencies that could be implemented to reduce the rulemaking time. We found that OAQPS was addressing the problems and delays they encountered. We performed a detailed review of two completed MACT standards and a MACT partnership pilot project that is expected to be finished in 1996. With assistance from officials in the Office of Air Quality Planning and Standards (OAQPS), we picked one MACT that worked well (Magnetic Tapes - surface coatings), one that experienced problems (Petroleum Refineries), and one of the MACT partnership pilot projects (Bakers Yeast Manufacturing).

- **MACT That Worked Well**. The MACT that worked well was promulgated in about 4 years. The project leader told us the industry consisted of less than 30 plants and about half were major sources of air toxics. This rule was identified as nonsignificant (exempt from OMB review) and tier 3 (exempt from high level EPA review), which likely speeded the process. Industry became involved early in the process. An industry representative said that from prior experience with government regulations, they knew if they were not involved before the proposal they would not have much impact on the final outcome. Though it was a long process, the industry representative said they ended up with a good rule that was flexible and responsive to industry. We believe the factors that contributed to the success of this MACT were a relatively small industry, lower level review, early industry involvement, and limited or no controversy with the industry.

- **MACT That Had Problems**. The MACT that experienced problems was completed under court order in four and a half years. An Agency official said that previously, with statutory deadlines, decisions were put off and few regulations were promulgated. He said that court-ordered deadlines are very effective; decisions must be made and regulations are promulgated much more quickly. The implication is that without a court-ordered deadline, this MACT would have taken considerably longer than four and a half years. This MACT involved a large industry and a great amount of controversy including Congressional inquiries. It was an industry that was already heavily regulated. The industry was split into two factions, generally determined by company size. Large companies, located mainly in urban areas, had upgraded their control technology to meet prior regulations. Small companies, on the other hand, were located mainly in non-urban areas and were not previously required to update their control technology. Also, the small companies could least afford expensive control changes. EPA estimated that approximately zero to seven companies would be put out of business by the MACT requirements; the small companies argued that the number was understated. This standard was delayed partly because industry had to respond to a second questionnaire after small companies complained that they were not represented in the first questionnaire. In fact, the first questionnaire went only to the large companies because they had the most advanced technology which would be used to establish the MACT standard. We believe the major factor that caused problems for this MACT was a politically strong and divided industry.

- **MACT Partnership Pilot Project**. EPA officials expected this MACT to take 2 years from start to finish which was 2 years faster than any of the previous MACT standards. It involved a relatively small industry of 13 plants (owned by about six companies) located in ten states. EPA formed a partnership with two states that had implemented state regulations. This MACT standard was scheduled for promulgation in the year 2000. The project leader told us that industry supported the effort to get the MACT out 4 years before the deadline for economic reasons. The improvements in technology required by the new rule could increase their yield and the improvements would more than pay for themselves. On the down side, a state official recalled a problem that arose because a company was concerned about providing confidential business information that might find its way to one of their competitors that was

located in the state of one of the MACT partners. He said the appearance of favoritism toward companies in the MACT partner's state could be a problem for MACT partnerships. Factors contributing to the success of this MACT partnership include having interested states and a cooperative industry.

Conclusion

Our review of the MACT standards identified the complexities involved in developing the various MACTs. We found it difficult, if not impossible, to compare the current activities with the MACTs begun under conditions that no longer exist. For example, many regulations no longer require OMB and high level EPA review; later regulations also benefit by using parts of previously written rules; and, following the reorganization of OAQPS in early fiscal year 1995, rules are now prepared in one group rather than the former practice of starting in one branch and being completed in another. We found that OAQPS was addressing the problems and delays they encountered. The following section discusses many of the initiatives OAQPS staff adopted to improve and speed the MACT development process.

OAQPS ADOPTS INITIATIVES TO IMPROVE THE MACT DEVELOPMENT PROCESS

During the first four years of the new approach, EPA made progress toward fulfilling the legislative mandate. However, the Agency was falling behind schedule for completing MACT standards within the statutory timeframes. The Act required EPA to regulate 25 percent of the source categories by November 15, 1994, another 25 percent by November 15, 1997, and remaining source categories by November 15, 2000. The Agency allocated 45 source categories to be completed by the 1994 deadline, 42 by the 1997 deadline, and 87 by the year 2000 deadline. As of March 1995:

- Nine MACT standards had been promulgated which regulated 20 source categories, or about 11 percent of the total. The remaining 25 source categories slated for completion by November 1994 were under court-ordered deadlines with all to be promulgated by May 1996.

- All MACT standard projects due in November 1997 were started. Twenty-eight MACT standards will be promulgated to regulate the 42 source categories.

- Work had started on 14 of the remaining 87 source categories that are due by November 2000.

An attorney in EPA's Office of General Counsel said that EPA will not miss court-ordered deadlines. An OAQPS official stated that EPA met all the court-ordered deadlines; however, extensions can be granted through agreements with plaintiffs.

During our review, OAQPS and other stakeholders discussed many initiatives and other factors that improved and speeded the MACT development process. While recognizing that OAQPS is not meeting the statutorily mandated schedule established by Congress, we believe OAQPS has been proactive in seeking and putting to use innovations to speed and improve the MACT development process. We discussed several of these initiatives with OAQPS and other stakeholders.

- **Futures Team**. The Futures Team was formed by OAQPS in the early 1990's to generate ways to shorten the MACT development process in response to expected budget cuts. Its mission was to analyze the roles and responsibilities of its Emissions Standards Division and to identify ways to streamline processes and achieve CAAA goals within the reduced budget. The Futures Team resulted in (1) a system for typing the MACTs and (2) the MACT Partnership Program.

- **Typing (Grouping) of MACTs**. OAQPS developed a system for grouping MACTs into Type A, B, or C. A representative told us that typing was their procedure for sorting MACTs with regard to the amount of information and resources it takes to complete the rule. The Futures Team recognized that planning

was an important element needed to speed and improve the overall process. "Typing" formalized planning by setting the scope of each project up front and gaining a commitment by those involved.

- **MACT Partnerships**. Probably the most well-known initiative adopted by OAQPS is the MACT Partnership Program. The Partnership Program is characterized by EPA and states working together with industry and environmentalists to fulfill the mandate to set MACT standards for sources of air toxics. This program is expected to reduce the time, resources, and funds needed for completing the MACTs. Partnerships are founded on the mutual interests of the major stakeholders in the air toxics program (EPA, state governments, industry, and environmentalists).

- **Tiering of Agency Regulations**. Under this Agency-wide program, all rules (both planned and under development) are classified into either Tier 1, 2, or 3. For example, Tier 1, requires the highest level of review of the three tiers and generally takes the longest to complete. The characteristics of Tier 1 regulations include cross-Agency controversy, great impact on the public, high external and political interest, and controversy with other Federal Agencies. Approximately half of the MACT Standards are categorized as tier 3, only one or two MACTs are categorized as tier 1, and the remaining MACTs are categorized as tier 2.

- **Nonsignificant Rules Exempt from OMB Review**. In addition to time saved through OAQPS "typing" and Agency-wide "tiering," proposed rules can be classified "nonsignificant" and do not undergo OMB review. Elimination of the OMB review can save up to six months during promulgation.

- **Regulatory Negotiation**. A regulatory negotiation brings all the stakeholders together to develop a regulation. A regulatory negotiation requires the parties to reach a consensus. Since everyone must agree on the final outcome, the development process can be very time consuming. However, once consensus is reached, the rest of the process goes very easily because the proposal is accepted and there is no need for public hearings and time consuming rewrites and litigation over the final rule.

- **Workshops and Working Meetings**. OAQPS hosted implementation workshops and working meetings with regional, state, and local government representatives. At these gatherings, EPA officials discuss the direction of the program and obtain ideas from outside parties.

Conclusion

In summary, our review of the development process of the MACTs showed that OAQPS was actively seeking and adopting initiatives to speed and improve the process. Since the enactment of the CAAA in 1990, OAQPS issued regulations at a much faster rate than clean air regulations issued prior to the CAAA. However, to meet the deadlines set by Congress, they must continue and even accelerate the issuance of regulations between now and the year 2000. Our review of these various initiatives revealed that several have already proven effective (i.e., Tiering Program and Nonsignificant designation for OMB) and others appear to have merit (i.e., MACT Partnerships and Regulatory Negotiations). We support OAQPS's efforts to seek and implement any and all possible ways to speed and improve the regulatory development process.

EVALUATION OF EPA'S METHOD FOR DETERMINING THE MACT FLOOR

Our other objective was to evaluate EPA's method for determining the MACT floor. The method of calculating the MACT floor as set forth in the CAAA required EPA to determine the emission reductions of the various sources and then average the top 12 percent (or top five sources for industries with less than 30 sources) to establish the emission limit or standard. We found that the method for computing the emission limit, as required by the CAAA, is not completely defined. For example, the emission limit calculated from the top 12 percent could result in a standard which equals no emissions control. The Agency refers to this as a "negative" standard. Regardless of its shortcomings, OAQPS officials believe that the current law provides for set limits and

strengthens their position when dealing with industry. They prefer to work with the law as it is rather than attempting a change even though there are situations where strictly following the law results in ambiguities. For further discussion of calculating the MACT floor see Appendix 1.

Conclusion

Based on our review, we believe it would be helpful if the Agency sought clarification of the method for effectively determining the MACT floor. An ideal time for seeking such clarification would be during reauthorization of the Clean Air Act.

OVERALL CONCLUSIONS OF THIS REVIEW

From our review of Title III Section 112(c)(7) of the CAAA, we concluded that the law intended that R&D facilities be categorized as a separate category. However, from our discussions with Agency representatives and other stakeholders, we learned that no separate category now exists. We believe one solution for covering unregulated R&D facilities would be to create a separate category for R&D. We recommend that the Director, OAQPS establish a separate category covering research or laboratory facilities. OAQPS officials stated that they would take actions to establish a separate category for R&D.

The results of this review indicated that though the Agency was behind schedule for promulgating the MACT standards within the statutory timeframes, they actively sought and put to use many initiatives to speed and improve the MACT development process. Our review of the various initiatives revealed that many have already proven effective and others have merit. We support these efforts and believe the Agency is making progress toward meeting the legislative requirement for regulating air toxic pollutants by the year 2000.

We learned that calculating the emission limit as required by the CAAA does not always result in an unambiguous emission standard. Regardless of its shortcomings, OAQPS officials believe that the present situation strengthens their position when dealing with industry. They prefer to work with the law as it is rather than attempting a change. Based on our discussions with Agency officials, we concur with their position for the time being but believe it would be helpful if the Agency could get clarification or a more effective method of establishing a floor at a convenient time such as reauthorization of the CAAA.

AGENCY COMMENTS AND OIG EVALUATION

The Director of the Office of Air Quality Planning and Standards regards our conclusions and recommendations as fair assessments of the MACT standards development program and plans to develop a separate source category for research and development facilities at major sources. A copy of OAQPS comments is included as Appendix 2.

APPENDIX 1

EPA'S METHOD FOR CALCULATING THE MACT FLOOR

The CAAA required the Administrator to promulgate regulations establishing emission standards for each of the 174 source categories. It set forth the basic methodology by which these standards were to be developed. The methodology required the Agency to determine the emissions reductions of the various sources and then average the top 12 percent to establish what is commonly referred to as the MACT floor or emission limitation. There is an exception for small industries. If a source category has less than 30 sources, the best five performing sources are averaged to arrive at the MACT floor. Most MACT regulations require that existing sources meet the MACT floor within 3 years after promulgation.

To determine the MACT floor, EPA ranks the existing sources in each source category using emission reduction data gathered from questionnaires and other sources. Emission reductions are the difference between having no controls and the amount that escapes. For example, 80 percent emission reduction means 80 percent of emissions is controlled and 20 percent escapes. The agency averages the best 12 percent of emission reductions from the ranking list to arrive at the MACT floor.

Requirement for Averaging Emission Reductions Was An Unexpected Addition to the CAAA

An EPA official who recalled the legislative struggle said the word "average" was an unexpected last minute change to the Act. Originally, the Senate version called for a cutoff at the 10 percent of the best performing sources, the House version called for 15 percent, and the compromise was 12 percent. The final result in Section 112(d)(3) NEW AND EXISTING SOURCES states:

"Emission standards promulgated under this subsection for existing sources . . . shall not be less stringent and may be more stringent than--(A) the average emission limitation achieved by the best performing 12 percent of the existing sources . . . with 30 or more sources or (B) the average emission limitation achieved by the best performing 5 sources . . . with fewer than 30 sources.

The requirement to average the emission reductions usually results in a higher level of emission limitations than the 88 percentile implied by using the top 12 percent. The issue of whether Congress intended a lower or higher floor (88th percentile or the average percentile of the top 12 percent) resulted in controversy. EPA's Office of General Counsel determined that the language and the legislative history support the higher floor interpretation.

Averaging Emission Reductions Results in Ambiguity

EPA officials pointed out that computing the emission limitation as required by the CAAA can result in ambiguity. So far, EPA managed to accommodate such situations. For instance, the term average is not defined in the CAAA, and they have interpreted "averaging" to mean using either the arithmetic mean, median, or mode.[(1)] An EPA official said that a precedent was set when the practice was written into the Hazardous Organic NESHAP[(2)] (HON), the MACT standard for the Synthetic Organic Chemical Manufacturing Industry. The official said that regulation contained good references for EPA's position and the public comments.

Averaging the top 12 percent emission reductions complicates the process of determining the emission limitation. The following hypothetical examples and problems demonstrate situations that produce ambiguity when following the calculation method required by the CAAA. In one example, the emission limitation can promote the less efficient technology; and in the other example, the emission limitation fits only the outermost conditions of two technologies. Agency officials also told us about another problem associated with averaging emission reductions that results in a "negative" MACT floor.

SOURCE	CONTROL TECHNOLGY	EMISSION REDUCTIONS
1	Fabric Filters	80%
2	Fabric Filters	80%
3	Wet Scrubbers	70%
4	Wet Scrubbers	70%

Example 1

In Example 1, the average emission limitation could be either 74 percent (the arithmetic mean) or 70 percent (both the median and mode). If EPA uses 74 percent to determine the MACT floor, the next most stringent technology would be fabric filters at 80 percent. Wet scrubbers would not meet the requirement and would have to be replaced with better control technology. If EPA uses 70 percent to determine the MACT floor, wet

scrubbers would be the standard but not the maximum achievable control technology. Either wet scrubbers or fabric filters could be used. In this example, the arithmetic mean fits neither technology, and the median and mode promote the less desirable technology. If averaging was not required, both technologies would be acceptable.

In Example 2, the average

SOURCE	CONTROL TECHNOLGY	EMISSION REDUCTIONS
1	Fabric Filters	90%
2	Fabric Filters	75%
3	Wet Scrubbers	75%
4	Wet Scrubbers	70%
Example 2		

emission limitation would be 75 percent using either the arithmetic mean, median, or mode. In this situation, a 75 percent MACT floor matches two control technologies: Wet scrubbers that are used very well and fabric filters that are not used well. EPA can require that all existing sources either (1) achieve 75 percent emission reductions by using either fabric filters or wet scrubbers or (2) use fabric filters which is the better technology overall. In this example, the average emission reductions fits only the outermost conditions of two technologies. Again, if averaging was not required, both technologies would be acceptable.

OAQPS officials told us about another problem associated with averaging emission reductions referred to as a "negative" MACT floor. A "negative" MACT floor determination happens when:

- the MACT floor (calculated from the top 12 percent) equals "no emissions control,"

- the MACT floor can not be determined due to the nature of the pollutant or process, or

- not enough emissions information is available to compute the MACT floor.

For example, if only five sources exist in a source category and two of the sources have controls and three do not, using the median or mode would result in a "negative" MACT floor determination. There have been no instances of a "negative" MACT floor for the early MACTS since they were mostly made up of larger industries that already had controls in place. OAQPS officials said that a good possibility exists that a "negative" MACT floor could occur in the future MACTs since they are mostly smaller industries that do not have controls in place.

The above examples of MACT floor determination and the "negative" MACT floor demonstrate situations where following the CAAA requirements to average emission reductions can result in ambiguity.

Averaging Complicated MACT Floor Determination, However EPA Found Solutions

We spoke with Agency officials about attempting to change the requirement to average emission reductions to arrive at a MACT standard. Officials believe they have been able to work around the ambiguity, and would prefer not to seek legislative clarification at this time.

(Electronic version of Appendix 2 not available)

APPENDIX 3

DISTRIBUTION OF REPORT

Inspector General (2410)

Deputy Inspector General (2410)

Director, Emissions Standards Division, OAQPS (Durham, NC)

Agency Followup Official (3304), Attn: Assistant Administrator for Administration and Resources Management

Agency Followup Coordinator (3304), Attn: Director, Resources Management Division

Audit Followup Coordinator (3304), Attn: Audit Management Branch

Audit Followup Coordinator (3802F), Attn: Office of Policy, Training, and Oversight Division

Audit Followup Coordinator (1104), Attn: Executive Support Office

Headquarters Library (3404)

Footnotes

1. Different kinds of averages are often used to describe where the center, or most typical value, of a set of data lies. They are called measures of central tendency, and the three most common and their definitions are:

- Arithmetic mean is the sum of the data divided by the number of pieces of data
- Median is the dividing point between the top half and bottom half of data
- Mode is the most frequent value

2. National Emission Standards for Hazardous Air Pollutants (NESHAP)
