

### **3.0 NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) AND REGIONAL HAZE (RH) ALTERNATIVES ASSESSED**

#### **3.1 INTRODUCTION**

The assessment of the available quantitative and qualitative health effects data presented in the criteria documents and the Office of Air Quality Planning and Standards (OAQPS) Staff Papers, together with recommendations from the Clean Air Scientific Advisory Committee (CASAC) and other public commenters, suggest a range of alternatives for short-term (24-hour) and long-term (annual) particulate matter (PM) standards and for an 8-hour ozone standard. Based on the available scientific data, the Environmental Protection Agency (EPA) proposed new and revised PM and ozone standards on November 27, 1996. The EPA is also proposing a rulemaking on RH.

For a comprehensive discussion of the scientific data that serve as a basis for these alternatives as well as the rationale for the Administrator's approach to this decision, the reader is referred to the OAQPS Staff Papers and Criteria Documents, as well as the Federal Register notices announcing the Administrator's proposed and final decisions.

Although EPA received numerous comments and suggestions concerning the alternatives that should be evaluated in this regulatory impact analysis (RIA), there is a limit to the number of different analyses that could be performed, due to time, resource, and other constraints. The alternatives described below are chosen because EPA believes they provide a sufficient variation within the range indicated by the data and because these alternatives could be assessed given available data and models. This RIA includes an evaluation of the incremental benefits and costs associated with these alternatives in relation to the current PM and ozone NAAQS baseline. The current standards are the appropriate baseline to use because they represent the point of comparison for the future if no new standards are implemented. The analysis assists in informing the public regarding which alternatives may return the greatest benefits in relation to the costs incurred when implemented by the States.

## **3.2 DESCRIPTIONS AND RATIONALES FOR STANDARDS EVALUATED**

### **3.2.1 Current PM<sub>10</sub> Standards**

The current particulate matter annual and 24-hour standards 50 µg/m<sup>3</sup>, annual arithmetic mean and 150 µg/m<sup>3</sup> 24-hour, one expected exceedance. These standards are abbreviated as PM<sub>10</sub> 50/150. The EPA is retaining the PM<sub>10</sub> standards at their current level, but is changing the form of the 24-hour PM<sub>10</sub> standard to the 99th percentile concentration over a 3-year period. This form of the standard is not analyzed in this RIA because it is considered a relaxation from the current standard and would, therefore, result in a cost savings when compared to the current standard. The annual standard will be retained in its current form.

### **3.2.2 Alternative New PM Standards**

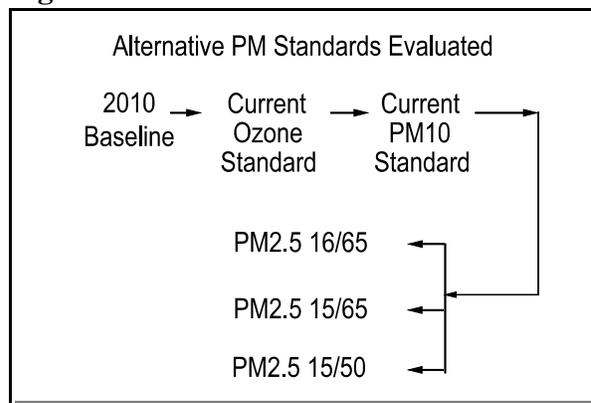
On November 27, 1996, EPA proposed to revise the current primary PM<sub>10</sub> standards by adding two new primary PM<sub>2.5</sub> standards set at 15 µg/m<sup>3</sup>, annual mean, and 50 µg/m<sup>3</sup>, 24-hour average, to provide increased protection against a wide range of fine particle PM-related health effects as described in Chapter 2. The proposed annual PM<sub>2.5</sub> standard was based on the 3-year average of the annual arithmetic mean PM<sub>2.5</sub> concentrations, spatially averaged across an area. The proposed 24-hour PM<sub>2.5</sub> standard was based on the 3-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations at each monitor within an area. After reviewing comments on these proposed standards, EPA has selected final standards of 15 µg/m<sup>3</sup>, annual mean, and 65 µg/m<sup>3</sup>, 24-hour average. The proposed 24-hour PM<sub>2.5</sub> standard is based on the 3-year average of the 98th percentile of 24-hour PM<sub>2.5</sub> concentrations at each monitor within an area.

The EPA proposed to revise the current secondary PM standards by making them identical to the suite of proposed primary standards. These standards, in conjunction with the establishment of a regional haze program under section 169A of the Act, would provide appropriate protection against PM-related public welfare effects including soiling, material

damage, and visibility impairment.

This RIA evaluates three sets of alternative PM<sub>2.5</sub> standards as shown in Table 3.1. Figure 3.1 is a schematic of the process for evaluating these standards. The term “2010 Baseline” in Figure 3.1 and the other figures that follow refers to estimated air quality in the year 2010 if current Clean Air Act (CAA) requirements are implemented. This is used as a starting point for all of the analyses in this

**Figure 3.1 Schematic of PM Alternatives**



RIA. This is discussed in more detail in Chapter 4. The first of these are standards of 15 µg/m<sup>3</sup> spatially-averaged annual arithmetic mean and 50 µg/m<sup>3</sup> 24-hr, average of the 98th percentile concentration over a 3-year period (PM<sub>2.5</sub> 15/50). These standards were chosen because they are the levels of the proposed new standards as discussed above. The second set of standards are 15 µg/m<sup>3</sup> spatially-averaged annual arithmetic mean and 65 µg/m<sup>3</sup> 24-hr (PM<sub>2.5</sub> 15/65). These were chosen because they are the selected standards. The third set of standards are 16 µg/m<sup>3</sup> spatially-averaged annual arithmetic mean and 65 µg/m<sup>3</sup> 24-hr (PM<sub>2.5</sub> 16/65). These standards were chosen because they bound the selected standards. All of these standards are within the range recommended by CASAC. A sensitivity analysis also was performed to compare the 98th and 99th percentile forms for the PM<sub>2.5</sub> 15/50 standards.

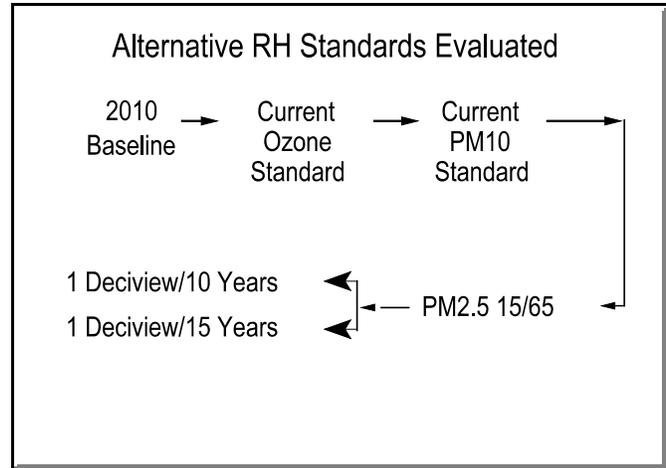
**Table 3.1 PM Alternatives Assessed**

| PM Alternatives   | Cost | Benefit | Economic Impact |
|---|------|---------|-----------------|
| PM <sub>2.5</sub> Standard 15µg/m <sup>3</sup> , 24-hour/50µg/m <sup>3</sup> , annual (PM <sub>2.5</sub> 15/50) | ✓    | ✓       |                 |
| PM <sub>2.5</sub> Standard 15µg/m <sup>3</sup> , 24-hour/65µg/m <sup>3</sup> , annual (PM <sub>2.5</sub> 15/65) | ✓    | ✓       | ✓               |
| PM <sub>2.5</sub> Standard 16µg/m <sup>3</sup> , 24-hour/65µg/m <sup>3</sup> , annual (PM <sub>2.5</sub> 16/65) | ✓    | ✓       |                 |

### 3.2.3 Regional Haze Rulemaking Scenarios

The proposed presumptive standard for visibility improvement is a 1 deciview improvement every 10 years. As shown in table 3.2, costs, benefits and economic impacts are evaluated after application of the selected PM<sub>2.5</sub> standards of 15/65. In addition, a standard of 1 deciview improvement over every 15 years (or .67 deciview over 10 years) is evaluated. Figure 3.2 is a schematic of the process for evaluating these scenarios. The regional haze scenarios are evaluated after application of the PM standards because implementation of the PM standards should provide significant progress toward meeting regional haze requirements.

**Figure 3.2 Schematic of Regional Haze Scenarios**



**Table 3.2 Regional Haze Alternatives Assessed**

| Regional Haze Alternatives  | Cost | Benefit | Economic Impact |
|---|------|---------|-----------------|
| 1 deciview improvement per 10 years (after PM <sub>2.5</sub> 15/65) | ✓    | ✓       |                 |
| 1 deciview improvement per 15 years (after PM <sub>2.5</sub> 15/65) | ✓    | ✓       |                 |

### 3.2.4 Current Ozone Standard

The current ozone standard is 0.12 parts per million (ppm), 1-hour, 1 expected exceedance averaged over 3 years. This standard is abbreviated as 0.12, 1Ex.

### 3.2.5 Alternative New Ozone Standards

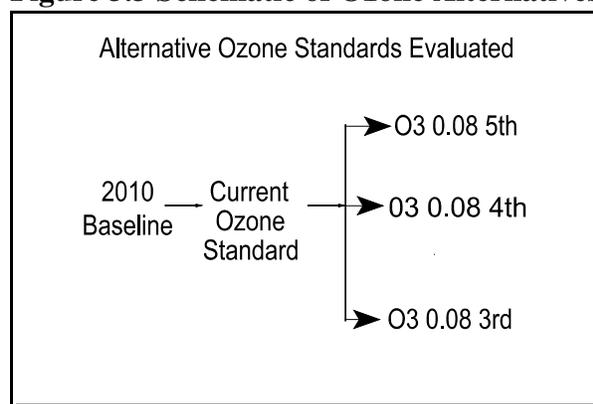
On November 27, 1996, EPA proposed to change the current primary ozone standard in the following respects: 1) attainment of the standard would no longer be based upon 1-hour averages, but instead on 8-hour averages; 2) the level of the standard would be lowered from the present 0.12 parts per million (ppm) to 0.08 ppm; and 3) the proposed NAAQS would be met in an area if the 3rd maximum daily maximum ozone concentration, averaged over 3 years, is less than or equal to .08 ppm. After reviewing comments, EPA selected a standard of 0.08 ppm, 4th maximum 8-hour daily maximum.

The EPA also proposed to replace the current secondary standard with one of two alternative standards: one set identical to the proposed new primary standard or, alternatively, a new seasonal standard expressed as a sum of hourly ozone concentrations greater than or equal to 0.06 ppm, cumulated over 12 hours per day during the consecutive 3-month period of maximum concentrations during the ozone monitoring season, set at a level of 25 ppm/hour. Either of the proposed alternative secondary standards would provide increased protection against ozone-induced effects, such as agricultural crop loss, damage to forests and ecosystems, and visible foliar injury to sensitive species. The EPA has chosen to set the secondary standard identical to the primary standard. Therefore, no separate analysis of the secondary standard is included in this RIA.

This RIA evaluates three alternative primary ozone standards as shown in Table 3.3. The selected standard of 0.08 ppm, 4th maximum 8-hour daily maximum (0.08 4th max) is assessed. In addition, a standard of 0.08 ppm, 3rd maximum 8-hour daily maximum (0.08 3rd max) and a standard of 0.08 ppm, 5th maximum 8-hour daily maximum (0.08 5th max) are analyzed.

These latter two standards are chosen for analysis and presentation to bound the selected standard. Figure 3.3 is a schematic of the process of evaluating these standards.

**Figure 3.3 Schematic of Ozone Alternatives**



**Table 3.3 Ozone Alternatives Evaluated**

| Ozone Alternatives  | Cost | Benefit | Economic Impact |
|---|------|---------|-----------------|
| Alternative 0.08 ppm, 3rd Maximum 8-hour Daily Maximum (0.08 3rd max) | ✓    | ✓       | ✓               |
| Alternative 0.08 ppm, 4th Maximum 8-hour Daily Maximum (0.08 4th max) | ✓    | ✓       | ✓               |
| Alternative 0.08 ppm, 5th Maximum 8-hour Daily Maximum (0.08 5th max) | ✓    | ✓       |                 |

Although Executive Order 12866 requires that all alternatives be examined, only the most likely ones need to be analyzed in detail. Because the CAA requires EPA to promulgate national standards, there are few likely alternatives to be considered. One alternative to changing the PM and ozone standards is to maintain the *status quo*. This is the “no regulation” alternative. For both PM and ozone, recent new scientific evidence examined in the Criteria Documents and Staff Papers indicates that the current standards do not provide an adequate level of protection as required by the CAA. Therefore, given the requirements of the CAA for the Agency to provide an adequate level of public health protection, a “no regulation” alternative is not considered a reasonable option.

Given the statutory requirements, other alternatives are not specifically evaluated. However, to the extent possible, these alternatives are factored into the analysis and may provide important tools for flexible implementation of the standards. For example, other regulatory approaches such as performance- and technology-based standards and regional controls are considered. Performance- and technology-based standards serve as useful adjuncts to ambient standards. However, they cannot serve as substitutes for ambient standards since even perfect compliance with them may not produce acceptable air quality levels. Performance- and technology-based standards are required by the present law in a variety of forms (e.g., new source performance standards for new and modified sources, lowest achievable emission rate,

and reasonably available control technology in non-attainment areas, etc.). They are not based solely on health and welfare criteria but are designed, in part, to augment control strategies for attainment of the NAAQS. These standards generally specify allowable emission rates for specific source categories. Emission reductions from such standards were considered in the baseline for this analysis as appropriate. In addition, the analysis incorporates in the baseline certain regional control strategies that serve to reduce the amount of transported pollutants. This, in turn, reduces the burden on downwind areas and may result in a more cost-effective approach to attaining standards.

This analysis also considers market based approaches to the extent they are currently in place (e.g., acid rain) as well as through modeling of an emissions cap and trade program for utilities. Additional opportunities for PM and ozone management through the application of market based mechanisms for further nitrogen oxides and sulfur dioxide reductions may be identified and evaluated during the development of implementation plans for the new and revised standards.

### **3.3 REFERENCES**

- U.S. Environmental Protection Agency (1996a), Air Quality Criteria for Ozone and Related Photochemical Oxidants. Office of Research and Development; Office of Health and Environmental Assessment; Research Triangle Park, N.C.; EPA report nos. EPA/600/P-93/004aF-cF.
- U.S. Environmental Protection Agency (1996b), Air Quality Criteria for Particulate Matter. Office of Research and Development, Office of Health and Environmental Assessment; Research Triangle Park, N.C.; EPA report no. EPA/600/P-95/001aF; April.
- U.S. Environmental Protection Agency (1996c), Review of the National Ambient Air Quality Standards for Ozone: Assessment of Scientific and Technical Information. Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; EPA report no. EPA/4521R-96-007.

U.S. Environmental Protection Agency (1996d), Review of the National Ambient Air Quality Standards for Particulate Matter: Assessment of Scientific and Technical Information. Office of Air Quality Planning and Standards; Research Triangle Park, N.C.; EPA report no. EPA/4521R-96-013.