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March 9, 2010

**MEMORANDUM**

**SUBJECT:** CASAC Review of the *Policy Assessment for the Review of the Particulate Matter National Ambient Air Quality Standards -- First External Review Draft*

**FROM:** Lydia N. Wegman, Director  
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**TO:** Holly Stallworth  
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Attached is the draft document, *Policy Assessment for the Review of the Particulate Matter National Ambient Air Quality Standards - First External Review Draft* (Policy Assessment), prepared by the Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards (OAQPS) staff as part of EPA's ongoing review of the national ambient air quality standards (NAAQS) for particulate matter (PM). This document will be the focus of a review by the Clean Air Scientific Advisory Committee (CASAC) Particulate Matter Review Panel (the Panel), scheduled as a teleconference for April 8-9, 2010.

The attached draft Policy Assessment document presents factors relevant to EPA's review of the current primary (health-based) standards and secondary (welfare-based) standards for both fine and coarse particles. This draft document draws upon information assessed and presented in the final *Integrated Science Assessment for Particulate Matter*, prepared by EPA's National Center for Environmental Assessment after undergoing review by the Panel and the public, and the second drafts of the *Quantitative Health Risk Assessment for Particulate Matter* (Risk Assessment) and the *Urban-Focused Visibility Assessment for Particulate Matter* (Visibility Assessment), which will be reviewed at a meeting of the CASAC Panel scheduled for March 10-11, 2010 in Research Triangle Park, NC.

Following CASAC and public review of this first draft Policy Assessment, we will produce a second draft Policy Assessment for CASAC and public review, prior to preparing a final Policy Assessment in July 2010. Our review of the PM NAAQS will conclude with Agency rulemaking. Our current schedule anticipates that proposed and final rules will be signed in November, 2010, and July, 2011, respectively.

## Document for Review

We will send printed copies of the first draft Policy Assessment, described below, to members of the Panel. In addition, we request that you forward to the Panel the electronic file containing this document. This document will also be available on the EPA website: [http://www.epa.gov/ttn/naaqs/standards/pm/s\\_pm\\_2007\\_pa.html](http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_pa.html). Attached to this memorandum are charge questions to guide the Panel's review of this document.

- *Policy Assessment for the Review of the Particulate Matter National Ambient Air Quality Standard - First External Review Draft*

Chapter 1 includes information on the purpose and background for this review, as well as an overview of the general approach and organization of the policy assessment. Chapters 2 and 3 present staff observations and preliminary conclusions related to the review of the primary standards for fine and thoracic coarse particles, respectively. Each chapter begins with a discussion of policy assessment approaches and focuses on evidence-based considerations based on the updated scientific and technical information as assessed and presented in the final *Integrated Science Assessment*. In addition, chapter 2 also includes a discussion of quantitative risk-based considerations as assessed and presented in the second draft Risk Assessment. Preliminary staff conclusions are presented with regard to the adequacy of the current primary standards and potential alternative primary standards for consideration, in terms of indicators, averaging times, forms, and levels. Chapter 4 focuses on PM-related visibility impairment, and presents staff observations and preliminary conclusions with regard to the adequacy of the current standards and potential distinct secondary standards for consideration, in terms of alternative indicators, averaging times, forms, and levels. This chapter focuses on the updated scientific and technical information as assessed and presented in the final *Integrated Science Assessment* as well as the quantitative analyses presented in the second draft Visibility Assessment. Chapter 5 focuses on other PM-related welfare effects, including effects on climate, ecological effects, and effects on materials, and presents staff observations and preliminary conclusions with regard to the adequacy of the current standards and the extent to which information is available to support consideration of alternative standards.

We look forward to discussing this first draft Policy Assessment with the Panel at our upcoming teleconference in April. At the Panel's request, we will provide a brief overview of this document at the meeting on March 10-11 to provide context for the Panel's review of the second drafts of the Risk Assessment and Visibility Assessment at that meeting. Should you have any questions regarding this first draft Policy Assessment, please contact Ms. Beth Hassett-Sipple (919-541-4605; email [hassett-sipple.beth@epa.gov](mailto:hassett-sipple.beth@epa.gov)).

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**Attachment:**

Charge to the CASAC PM Review Panel for Review of the Draft PM Policy Assessment

## **Charge to the CASAC PM Review Panel for Review of the First Draft Policy Assessment for the Review of the Particulate Matter NAAQS**

The first draft Policy Assessment (PA) includes staff's preliminary evaluation of the policy implications of the scientific assessment of the evidence presented in the Integrated Science Assessment (ISA) and the results of quantitative assessment based on analyses presented in the second draft Risk and Exposure Assessments (REAs). Consistent with CASAC's comments on a preliminary draft Policy Assessment (September 2009) that encouraged the development of a document focused on key policy-relevant issues that draws from and is not repetitive of information in the ISA and REAs, staff have organized the discussion in the Policy Assessment around answering a series of policy-relevant questions. Taken together, the initial responses to these questions support preliminary staff conclusions and the identification of policy options for consideration in our review of the primary and secondary PM standards to address public health and welfare effects associated with exposure to ambient PM.

Staff asks the CASAC PM Panel to focus on the charge questions listed below in their review of the Policy Assessment, but we would appreciate comments on any other topics as well.

### **Overarching Questions (related to Chapters 2, 3, 4, 5)**

1. Organizational Structure
  - a. Does the Panel find the introductory and background material, including that pertaining to previous reviews of the PM standards and the current review, to be clearly communicated and appropriately characterized?
  - b. To what extent does the Panel find that the questions posed appropriately reflect the important policy-relevant issues for this review? Are there additional policy-relevant questions that should be addressed?
  - c. What are the Panel's views regarding the level of detail used to address these policy-relevant questions? Please comment on the extent to which the discussions are appropriately focused in addressing the questions.
2. Technical Content
  - a. The discussion of the health and welfare effects evidence draws from the currently available scientific evidence assessed and presented in the final ISA, which included consideration of information available from previous reviews. To what extent does the Panel find that this first draft PA accurately reflects and clearly communicates the currently available health and welfare effects evidence for PM, including important uncertainties, as characterized in the final ISA?
  - b. The discussions in chapters 2 and 4 also draw upon quantitative assessments conducted to inform this review. To what extent does the Panel find that this first draft PA accurately reflects and clearly communicates policy-relevant information from the human health risk and visibility assessments, including important uncertainties, as characterized in the second draft REAs?

**Review of the Primary Standard for Fine Particles (Chapter 2)**

**3. Approach (section 2.1.3):**

- a. What are the Panel's views with regard to the general approach of considering and integrating evidence-based and risk-based considerations to inform discussions of the adequacy of the current PM<sub>2.5</sub> standards and alternative standards under consideration?
- b. Please comment on the various approaches described for translating information from epidemiological studies into the basis for reaching preliminary staff conclusions on the adequacy of the current PM<sub>2.5</sub> standards and on alternative standards for consideration.

**4. Adequacy of current suite of standards (section 2.2):**

- a. What are the Panel's views regarding the ways in which the currently available evidence is considered to inform the preliminary staff conclusion that the evidence calls into question the adequacy of the current suite of standards? To what extent is the rationale for this preliminary conclusion clear and appropriate? (section 2.2.1)
- b. What are the Panel's views regarding the ways in which quantitative risk assessment is considered to inform the preliminary staff conclusion that the risks remaining upon simulation of just meeting the current suite of standards can reasonably be judged to be important from a public health perspective, and to inform our understanding of the relative roles of the annual and 24-hour standards in providing public health protection? To what extent is the rationale for this preliminary conclusion clear and appropriate? (section 2.2.2)
- c. What are the Panel's views regarding the integration of evidence-based and risk-based considerations to inform the preliminary staff conclusion that the available information clearly calls into question the adequacy of the current suite of standards? Is the Panel generally supportive of this conclusion? (section 2.2.3)

**5. Indicator (section 2.3.1):**

- a. Is the rationale supporting staff's preliminary conclusion that it is reasonable to retain PM<sub>2.5</sub> as an indicator for fine particles appropriate? Is the Panel generally supportive of this conclusion?
- b. Does the Panel generally support the preliminary staff conclusion that the currently available information is too limited to support a distinct PM standard for ultrafine particles?
- c. Does the Panel generally support the preliminary staff conclusion that the currently available scientific information is not sufficient to support consideration of a separate indicator for a specific PM<sub>2.5</sub> component or for the mix of fine particles from any specific source category? Does the Panel generally support the preliminary staff conclusion that the currently available scientific information is not sufficient to support eliminating any component or source category from the mix of fine particles included in the PM<sub>2.5</sub> indicator?

**6. Averaging Times (section 2.3.2):**

- a. Is the Panel generally supportive of staff's preliminary conclusion that it is reasonable to retain 24-hour and annual averaging times?
- b. Is the Panel generally supportive of staff's preliminary conclusions that the evidence is too limited to support additional averaging times (i.e., with an averaging time less than 24-hours to address subdaily exposures or with a longer averaging time to address seasonal exposures)? Is the rationale supporting our preliminary conclusions clearly articulated?

**7. Forms (section 2.3.3):**

- a. The discussion of the form of the annual standard is presented in conjunction with alternative levels. Staff outlines additional air quality analyses that will be conducted for the second draft PA to inform our evaluation of the appropriateness of a form that allows for spatial averaging across monitors, specifically with regard to the potential for disproportionate impacts on susceptible populations with lower socioeconomic status. What are the Panel's views on the usefulness of such additional analyses?
- b. The discussion of alternative 24-hour standards focuses on levels in conjunction with retaining the current 98<sup>th</sup> percentile form. Staff outlines additional air quality analyses that will be conducted to more fully explore peak-to-mean ambient concentrations to inform our understanding of the implications of retaining or modifying the current form. What are the Panel's views on the usefulness of such additional analyses?

**8. Levels (sections 2.3.4, 2.3.5, and 2.3.6):**

- a. What are the Panel's views regarding the ways in which the currently available evidence is considered to inform the preliminary staff conclusions regarding alternative levels? Recognizing that the ISA concluded that no discernable effects thresholds can be identified based on the currently available evidence, staff has explored a number of different air quality metrics for translating information from epidemiological studies into the basis for reaching preliminary staff conclusions on alternative levels. What are the Panel's views on the various approaches considered? (sections 2.4.1 and 2.5.1)
- b. What are the Panel's views regarding the ways in which the quantitative risk assessment is considered to inform preliminary staff conclusions on alternative levels? What are the Panel's views on the insights that can be gained from the quantitative risk assessment to inform our understanding of the roles that the annual and 24-hour standards play in providing public health protection? (sections 2.4.2 and 2.5.2)
- c. Preliminary staff conclusions regarding alternative levels integrate evidence-based and risk-based considerations. Staff has focused on a policy approach for identifying a suite of standard levels in which the annual standard would be the "generally controlling" standard to provide protection for both long- and short-term PM<sub>2.5</sub> exposures in conjunction with a 24-hour standard set to provide supplemental protection against days with high peak concentrations associated with localized "hotspots" and risk arising from seasonal emission that might not be controlled by a national annual standard. What are the Panel's views on this approach and on the rationale presented for this approach? (section 2.3.6)

- d. Does the Panel have any suggestions regarding additional considerations which could inform our consideration of alternative suites of fine particle standards?

### **Review of the Primary Standard for Thoracic Coarse Particles (Chapter 3)**

#### **9. Adequacy of the current 24-hour PM<sub>10</sub> standard (section 3.2):**

- a. In considering the expanded body of evidence supporting the link between PM<sub>10-2.5</sub> exposures and mortality and morbidity, staff's preliminary conclusion is that the available scientific evidence supports the appropriateness of maintaining a standard that protects against exposures to thoracic coarse particles. What are the Panel's views regarding this preliminary conclusion?
- b. In considering the current 24-hour PM<sub>10</sub> standard, this draft document also presents PM<sub>10</sub> air quality information for U.S. study locations where PM<sub>10-2.5</sub> effect estimates were positive and statistically significant. In considering this air quality information, as well as the overall body of evidence and its associated uncertainties, staff's preliminary conclusion is that, depending on the emphasis placed on different aspects of the evidence and uncertainties, it could be judged that the current PM<sub>10</sub> standard either does or does not provide adequate public health protection against exposures to thoracic coarse particles. What are the Panel's views on this preliminary conclusion, on the alternative approaches to considering the evidence and its uncertainties, and on the adequacy of the current PM<sub>10</sub> standard?

#### **10. Indicator (sections 3.3.1, 3.3.2, and 3.3.3):**

- a. In considering studies reporting PM<sub>10-2.5</sub> health effects in a variety of locations, staff's preliminary conclusion is that the currently available evidence supports maintaining a standard that provides protection against all thoracic coarse particles, regardless of their source of origin or composition. The preliminary conclusion is also presented that this could be achieved with either a PM<sub>10</sub> or PM<sub>10-2.5</sub> indicator, as long as the indicator is not qualified so as to exclude certain types of locations or sources. What are the Panel's views on these preliminary conclusions?
- b. In further considering the evidence relevant for a decision on indicator, this draft document discusses health studies of particles from a variety of locations, including particles of both urban and non-urban origin. Staff's preliminary conclusion is that this evidence could either support an indicator that allows lower PM<sub>10-2.5</sub> concentrations in urban areas than non-urban areas (i.e., PM<sub>10</sub>) or an indicator that does not allow such differences in PM<sub>10-2.5</sub> concentrations (i.e., PM<sub>10-2.5</sub>), depending on the emphasis placed on the relevant health studies and their associated uncertainties. What are the views of the Panel regarding this preliminary conclusion and regarding the appropriate indicator for a standard meant to protect against exposures to thoracic coarse particles?

11. **Averaging Time (section 3.3.4):** In light of studies supporting a link between short-term, but not long-term, exposures to PM<sub>10-2.5</sub> and mortality and morbidity, staff's preliminary conclusion is that the available evidence supports the appropriateness of a 24-hour standard to

protect against health effects associated with short-term exposures to thoracic coarse particles, but does not support the appropriateness of a long-term standard. What are the Panel's views on these preliminary conclusions?

12. **Form (section 3.3.6):** In considering specific concentration-based forms, staff notes that a 98<sup>th</sup> percentile form has been judged appropriate for short-term standards in some recent NAAQS reviews because such a form provides a balance between limiting peak pollutant concentrations and establishing a stable air quality statistic. In light of these considerations, staff's preliminary conclusion is that, if it is judged appropriate to consider revising the current 24-hour PM<sub>10</sub> standard, it would also be appropriate to consider a 98<sup>th</sup> percentile form, in conjunction with a suitable range of standard levels, for a 24-hour standard meant to protect against short-term exposures to thoracic coarse particles. What are the Panel's views on these considerations and on this preliminary conclusion?
13. **Level (section 3.3.7):** This draft document discusses a potential approach to identifying alternative levels for a 24-hour PM<sub>10</sub> and/or PM<sub>10-2.5</sub> standard. Specifically, staff notes that, to the extent it is judged appropriate to consider revising the current 24-hour PM<sub>10</sub> standard, ranges of appropriate standard levels for consideration could be identified based on 98<sup>th</sup> percentile, 24-hour average PM<sub>10</sub> and/or PM<sub>10-2.5</sub> air quality concentrations in locations where epidemiologic studies have reported associations between PM<sub>10-2.5</sub> and mortality and/or morbidity. In discussing this approach, staff notes that considerably more air quality information is available for PM<sub>10</sub> than for PM<sub>10-2.5</sub>. What are the Panel's views on this approach to identifying an appropriate range of alternative standard levels and on the appropriateness of basing such a range on available PM<sub>10</sub> versus the more limited PM<sub>10-2.5</sub> air quality concentrations?

#### **Review of the Secondary PM<sub>2.5</sub> Standards for Visibility-Related Effects (Chapter 4)**

14. **Adequacy (Section 4.2):** Staff's considerations in reviewing the adequacy of the current suite of PM<sub>2.5</sub> standards to address PM-related visibility impairment take into account both evidence-based and impact-based information. What are the Panel's views on the appropriateness of staff's integration of these considerations and on their use in informing preliminary staff conclusions regarding adequacy of the current suite of standards?
15. **Indicator (Section 4.3.1):**
  - a. What are the Panel's views regarding the appropriateness of considering PM light extinction and PM<sub>2.5</sub> mass as indicators for a distinct secondary PM standard for visibility protection? What are the Panel's views regarding the relative advantages and disadvantages associated with each indicator?
  - b. Staff recognizes that coarse particles play a role in PM-related visibility impairment. What are the Panel's views regarding staff's considerations related to the contribution of coarse particles in terms of the PM light extinction indicator?
16. **Averaging times (Section 4.3.2):** Recognizing the short-term (instantaneous) nature of the perception of visibility impairment and the short-term nature of relevant exposure periods for

the viewing public (less than one hour to multiple hours), staff has reached a preliminary conclusion that consideration should be given to a 1-hour averaging time. What are the Panel's views regarding staff's rationale for focusing on a 1-hour averaging time? Does the Panel have suggestions for other information that would help inform our consideration of alternative averaging times for a secondary standard to protect against PM-related visibility impairment?

17. **Levels and Forms (Section 4.3.3):** Staff presents ranges of options with varying levels and forms in combination with different indicators (light extinction and PM<sub>2.5</sub> mass-based indicators) and averaging times (1-hour daily maximum or each 1-hour average concentration during all daylight hours). What are the Panel's views regarding staff's preliminary conclusions regarding appropriate ranges of forms and levels to consider? Does the Panel have suggestions for other approaches that could help inform our consideration of alternative levels and forms?

#### **Review of the Secondary Standards for Other Welfare-related Effects (Chapter 5)**

18. **Climate (section 5.2):** Staff reaches the preliminary conclusion that there is insufficient information available in this review to base a standard on climate impacts associated with current ambient concentrations of PM. Does the Panel generally support this preliminary conclusion? To what extent is the rationale for this preliminary conclusion clear and appropriate?
19. **Ecological effects (section 5.3):** Staff reaches the preliminary conclusion that data are insufficient to support establishing a distinct standard for ambient PM based on ecosystem effects of particles not addressed in the ongoing NO<sub>x</sub>/SO<sub>x</sub> secondary NAAQS review. Does the Panel generally support this preliminary conclusion? To what extent is the rationale for this preliminary conclusion clear and appropriate?
20. **Material effects (section 5.4):** Staff reaches the preliminary conclusion that no new evidence is available in this review to call into question the adequacy of the protection for materials afforded by the current suite of PM standards. However, in the absence of new information that provides a basis for establishing a different level of control, staff reaches the preliminary conclusion that there is support for retaining an appropriate degree of control for both fine and coarse particles to provide protection against materials damage and soiling. Does the Panel generally support this preliminary conclusion? To what extent is the rationale for this preliminary conclusion clear and appropriate?