Chapter 1: Overview of this Regulatory Impact Analysis

Organization of this Regulatory Impact Analysis

On December 20, 2005, EPA proposed to revise the National Ambient Air Quality Standards for fine particles ($PM_{2.5}$) and to replace the current standards for PM10 with a new standard for a qualified indicator of inhalable coarse particles ($PM_{10-2.5}$).[1] This Regulatory Impact Analysis (RIA) outlines the analyses EPA has conducted on the costs and benefits of achieving the proposed revised (NAAQS) for fine particles ($PM_{2.5}$) and some alternative standard options. Because of time and data limitations outlined below, this analysis does not address the proposed new $PM_{10-2.5}$ standards. This chapter describes the role and purpose of the RIA, specifies the alternative standards we consider in this analysis, outlines innovative new tools we use in this RIA as well as other key differences between this RIA and those that precede it, and summarizes the organization of the subsequent RIA chapters and appendices.

The Role and the Purpose of this RIA

The Clean Air Act (CAA) directs EPA to identify and set national standards for certain common pollutants which cause adverse effects to public health and welfare. EPA is required to review the scientific criteria upon which these health and welfare-based standards are based and the standards themselves at five year intervals to determine whether, based on new research, revisions to the standards are necessary to continue to protect public health and the environment. As noted above, EPA has proposed revisions to the primary and secondary standards for $PM_{2.5}$ and is proposing new $PM_{10-2.5}$ standards. For more information see: http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_cr_fr.html.

This RIA addresses the proposed revisions relating to primary (health) and secondary (welfare) standards for fine particles[2], but for not coarse particles. Implementation of the proposed new coarse standards will occur over a longer time horizon than for the fine particles, and current emissions inventory information, air quality data, controls, air modeling and benefits analyses are incomplete. In addition, EPA is still considering implementation issues associated with any $PM_{10-2.5}$ standard; all of these factors complicate the analysis.

Although consideration of cost in setting of primary air quality standards is not required by the CAA, it does not mean that cost or other economic considerations are not important or should be ignored. The Agency believes that consideration of cost is an essential decision making tool for the cost-effective implementation of these standards. The implementation process is where decisions are made -- both nationally and within each community – that affect how much progress can be made, and what time lines, strategies and policies make the most sense. The Agency recognizes that it is important to provide Congress and the public with an analysis of the

[1] See: http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_cr_fr.html

[2] The analysis automatically considers the proposed secondary standards, which are identical to the proposed primary standards. Due to analytical and time constraints, the analysis does not address alternative short-term secondary standards that are noted in the proposal for public comment.

benefits and costs of this rulemaking. In addition, pursuant to Executive Order 12866 and OMB Circular A-4, this Regulatory Impact Analysis provides information on the nature of the $PM_{2.5}$ problem in this country and potential costs and benefits associated with various scenarios demonstrating how areas might implement the proposed revisions to the NAAQS for $PM_{2.5}$.

Illustrative Nature of this RIA

There are important differences between this RIA and other EPA RIAs that analyze the costs and benefits of proposed regulations. First, this RIA analyzes a series of illustrative implementation scenarios as opposed to costing out on a national scale a specific regulatory approach for reducing air pollution to desired levels. Like other RIAs, this document sets out the air quality challenge which the nation faces to reach tighter $PM_{2.5}$ NAAQS. However, under the CAA, the states have the ultimate responsibility to design and implement local and regional control strategies to meet a NAAQS in their State Implementation Plans (or SIPs). Because we cannot predict the composition of those controls, we analyze a series of control scenarios for five urban areas that we believe to illustrate what the states may ultimately implement. Furthermore, using this series of control scenarios, we are providing an analysis of five city-specific case studies in lieu of broad national estimates of attaining the proposed standard and alternative standard options.

To select these illustrative implementation control sets, we used information regarding: (1) the nature of the $PM_{2.5}$ air quality problem; and (2) the estimated cost-effectiveness of controls. Our analysis also assumes that when states develop and implement control strategies, they will design such strategies to meet both the existing $PM_{2.5}$ NAAQS and any new NAAQS as a means of minimizing total compliance cost with both standards.

Ideally, this RIA would also provide national cost and benefit estimates of illustrative control strategies to assess the nation's ability to reach the proposed $PM_{2.5}$ standard and alternative standard options. As we developed that analysis, we reached the conclusion that, at present, our available data and tools are insufficient to develop cost and benefit information which would accurately reflect the range of possible options which the States may choose to implement. Most significantly, we concluded that the national-scale analysis based on our current data and tools would not properly reflect the incremental costs and benefits of moving from the current standard to progressively more health-protective standards. However, we expect to complete this national-scale analysis in time for publication with the final rule (September 2006). Since the setting of the standard is health based and does not rely on the costs and benefits assessment, we believe that the data we present on the five cities provides useful information for the public to assess the implications of revising the $PM_{2.5}$ standards, and that it is appropriate to wait for more complete information before publishing national-scale results.

Finally, this RIA provides the essence of the analysis. Much of the analytical methodology is identical to that which was used in previous RIAs, such as the RIA for the Clean Air Interstate Rule (CAIR). For this reason, rather than repeating information already found in the CAIR RIA, we refer readers to that RIA. Further, we defer other supporting technical detail to Technical Support Documents, to be placed in the docket after publication of the proposed rule.

Levels of the Annual and Daily $PM_{2.5}$ Standard Considered

The preamble to the proposed rule lays out the proposed revisions to the primary $PM_{2.5}$ NAAQS and other alternatives upon which the Agency is requesting comment. For the RIA, we have selected a subset of options designed to encompass the alternative standards upon which the Agency is requesting comment. This analysis examines the current standard and 3 alternatives in depth. These are expressed in the following table as combinations of the annual and daily $PM_{2.5}$ standards, and are:

Table 1-1: Annual and Daily $PM_{2.5}$ NAAQS Analyzed in this RIA

Combination of Annual and Daily Values, in $\mu g/m^3$	*Notes*
15/65	Current standards
15/40	Alternative for comment
15/35	Proposed revisions
15/30	Alternative for comment
14/35	Alternative for comment

Baseline and Years of Analysis

In the RIA, we have chosen 2015 as the base year of analysis and included the following rules: the Clean Air Interstate Rule (CAIR), the Clean Air Visibility Rule (CAVR) and the Clean Air Mercury Rule (CAMR), the Clean Air Non-Road Diesel Rule, the Heavy Duty Diesel Rule, Tier 2, and the NOx SIP Call. 2015 serves as a logical base year for the RIA because it is a reasonable estimate of the date by which States would have actually implemented controls to attain the revised standard. Assuming promulgation in 2006, designations would require 3 years, and States would then have 5 years to attain (i.e. up to 2014, with an additional 5 year extension possible). This RIA analyzes all control scenarios on an incremental basis to this regulatory baseline.

Tools Utilized in this RIA

To estimate the costs and monetized human health benefits that result from states moving toward attainment with the standards above, we utilized several key tools and databases. These include: (1) the Response Surface Model (RSM) to estimate air quality changes associated with the implementation of different control strategies; (2) AirControlNET, a computer database of pollution control data; and, (3) BenMAP, a computer tool that estimates monetized human health

benefits resulting from changes in ambient $PM_{2.5}$. The discussion below provides an overview of the function of each tool.

1. *The RSM:* For the purposes of this RIA, EPA developed a Response Surface Model (RSM) to simulate air quality changes resulting from the application of both local and regional controls within nine selected urban areas[3] and region-wide controls across the United States. It is important to note that these nine urban areas are *not an exhaustive list of future non-attainment areas*. Rather, they represent the areas within the air quality modeling domain for which we could analyze control strategies without such controls affecting other RSM urban areas. In this analysis, we consider *five of these nine* urban areas that the model estimates to be out of attainment for some combination of the daily and annual standards under consideration. The RSM simulates changes in air quality at locations throughout the US, both within and outside the nine urban areas.

2. *AirControlNET:* This tool is a desktop-computer-based database of controls showing information on cost, efficiency and applicability. The program overlays a detailed control measures database of limited scope on EPA emissions inventories to compute source and pollutant specific emissions reductions and associated costs at various geographic levels.[4] Among its many capabilities, AirControlNET employs a least-cost control strategy module to meet a given percent emissions reduction target or absolute emissions tonnage reduction target.

3. *BenMAP:* BenMAP is a peer-reviewed computer program EPA has developed that integrates a number of the modeling elements used in previous RIAs (e.g., interpolation functions, population projections, health impact functions, valuation functions, aggregation and pooling methods) to translate modeled air concentration estimates into health effects incidence estimates and monetized benefits estimates. We use the BenMAP program to estimate the benefits from $PM_{2.5}$ and ozone air quality changes. Due to time constraints, for this proposal we are focusing principally on $PM_{2.5}$-reduction related health benefits. Reduction strategies that reduce NOx emissions will also have impact on ozone levels and ozone-related health effects. Reductions in a number of precursor emissions will also have environmental impacts, including reduced deposition to ecosystems and improved visibility.

Overview of Control Hierarchy

In examining control alternatives to attempt to meet the current and alternative standards, our analyses focus on a hierarchy of control strategies that takes into account regional differences in the nature of the air quality problems, as well as the results of national and regional strategies that have already been adopted to address some of them.

[3] These urban areas include Seattle WA, San Joaquin CA, Salt Lake City NV, Phoenix AZ, Denver CO, Dallas CO, Chicago IL, New York/Philadelphia NY/PA and Atlanta GA

[4] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. AirControlNET version 4.0. Control Measure Documentation Report. Prepared by E.H. Pechan and Associates. August 2005.

We first analyzed an "urban-only" strategy because EPA believes that now that the Agency has promulgated extensive national and regional rules - including mobile source rules (Tier 2 cars, Heavy Duty Diesel Engine rules, and Nonroad Mobile Source rules) and the Title IV SO2 and NOx controls, NOx SIP Call, Clean Air Interstate Rules (CAIR) covering the electric power sector, the Clean Air Visibility Rules covering the NOx and SO2 emissions of the power sector and more than 20 other industries and executed other related actions (NSPS and MACT controls with co-benefits) --States and localities would next focus on developing local controls to address the remaining fine particle attainment problems. Moreover, the available information regarding the scope and magnitude of the $PM_{2.5}$ air quality problem suggests that local strategies will be an effective strategy in addressing any tightening of the daily standard.

Some urban areas are likely to consider some combination of local and regional controls. For this reason, we examined the effect of moderate regional controls on the ability of urban areas to attain the standard options with reductions in urban area emissions. Similar to above, this approach uses a multi-tiered hierarchy of controls, dependent upon the specific standard being evaluated. Our ultimate analytical goal in following the hierarchy above was to generate cost-effective attainment strategies for each of the five RSM urban areas.

Organization of this Report

This report provides EPA's analysis of the costs and benefits of a set of illustrative control scenarios by which States can attain a revised NAAQS. The RIA chapters are as follows:

- *Chapter 2: Scope and Magnitude of the Problem*. This chapter details the nature of the $PM_{2.5}$ air quality problem.

- *Chapter 3: Analysis Methodology and Summary Results*. This chapter summarizes the key aspects of this analysis that changed from the CAIR RIA.

- *Appendix A: Five City Analysis Results*. This appendix presents the results of our 5-city urban area attainment strategy and our analysis of air quality, control cost and monetized human health benefits.

- *Appendix B: AERMOD Local-Scale Analysis*. This appendix provides a more detailed discussion of the local scale modeling analysis described in chapter 3.

- *Appendix C: AirControlNET Controls Database*. This appendix provides a complete list of control measures found in AirControlNET.

- *Appendix D: Additional Cost Data*. This appendix maps each of the 12 RSM control factors to their respective AirControlNET controls.

- *Appendix E*: *Methods for Projecting Air Quality Concentrations*. This appendix describes how we estimated future-year annual average and daily 98th percentile $PM_{2.5}$ concentrations.