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Economic Impact Analysis: The EPA Perspective

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I will set the framework for what we will try to accomplish with the economic analysis for the new particulate matter (PM) and ozone air quality standards. Economic analysis is referred to as the dismal science. I happen to enjoy it. I think it does have value, even though it is not considered within the specifics of the setting of air quality standards. When you read the newspapers, hear the debates within Congress, or hear the communications here, economics is often discussed and debated.

As indicated, I am the leader of the group that was responsible for putting together the National Ambient Air Quality Standards (NAAQS) cost/benefit study. There were close to twenty-five people that contributed to this. As you heard from previous speakers, the framework for the Clean Air Act (CAA)[2] does not allow economic factors to be consid-

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2. *See* Clean Air Act §§ 101-618q, 42 U.S.C. § 7401-7671(1990).

ered in setting the new NAAQS.[3] But, under Executive Order 12866,[4] the EPA is charged, along with all other federal regulatory agencies, to complete an economic analysis for any major rule.[5] While it was not part of the decision-making process, the economic analysis was intended to help policymakers understand how these rules fit into the continuum of decisions that need to be made. As you previously heard, these new standards have a greater impact than any individual rule that EPA has promulgated, not only under CAA, but also under most other authorities.

I will begin by talking about some of the caveats and limitations used to calculate the numbers involved in a cost-benefit analysis. We tried to conduct an analysis of a random period in the future. The year 2010 was chosen because it is far enough in the future to provide enough time for most of the areas to be able to attain the NAAQS. In contrast, the law provides that areas will be able to go beyond that period in order to reach the new air quality standards. For example, for ozone, that period is approximately the year 2012.[6] For PM, it actually extends out to the year 2017. When we completed our initial draft analysis, we did not try to project what it would take for everyone to reach the attainment of the new standards by 2010. There was a great deal of public comment about not projecting the costs and benefits of full attainment.

Therefore, you have before you two types of analyses. One looks at the partial attainment of the new standards. This is what we believe, given the current state of control technology, the costs and benefits would be for meeting the new standards under a hypothetical implementation scheme in 2010. We extended that, using what I would refer to as the "back of the envelope" assumptions, to come up with something that is labeled "full attainment cost projection." Again,

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3. *See* National Primary and Secondary Ambient Air Quality Standards, 40 C.F.R. pt. 50 (1997).

4. *See* Exec. Order 12,866, 58 Fed. Reg. 51,735 (1993).

5. *See* 5 U.S.C. § 804(2) (1998).

6. *See U.S. EPA Office of Air & Radiation, Office of Air Quality Planning and Standards Fact Sheet* (last modified July 17, 1998) <http://ttn.www.rtpnc.epa.gov/naaqsfin/impfac.htm>.

these estimates are for the year 2010, before EPA would require absolute attainment. The partial attainment numbers result from a model that is subject to many limitations. Looking at the "back of the envelope" calculation for full attainment also leads us to some of the same conclusions about the benefits and costs, as did the more certain results.

In developing the full attainment estimates, an arbitrary figure was derived based on the experience of what is a reasonable cost of control in various pollution programs, particularly California, and in other areas. We found that $10,000 per ton for either nitrogen oxide (NO_x) compounds or hydrocarbons is an upper bound that people are willing to pay to remove pollution. We, therefore, used that as our number for this "back of the envelope" calculation. In understanding how analysis can drive policy, we selected for our analysis what was included in the President's statement on implementation.[7] It is now the goal of both the EPA and the states to insure that these new NAAQS are implemented in a fashion that stays below this $10,000 per ton limitation.

The President used this $10,000 figure as a maximum. This is a new type of limitation on what people have put in place to reach these new standards. It is going to be an interesting thing, from an economics point of view, to see how this limitation affects the development of new technology and innovation, not only the technology, but also the manner in which the controls are put in place.

What you see in this economic analysis and in these partial attainment results is what happens when we look at the costs and benefits of both PM and ozone. I am comfortable in saying that the result will be that the benefits will always exceed the costs. The analysis supports the science and the Administrator made the right decision in going forward with these new NAAQS, from the point of view of the total economy.

When you break these two apart and look only at PM, as presented here, that still remains true. It is a different story

7. *See* Implementation of the Revised Air Quality Standards for Ozone and Particulate Matter, 62 Fed. Reg. 38,421 (1997).

when you look at the economics for the ozone standard. In terms of the ozone, the benefits approximate the costs, within the bounds of uncertainty, of the numbers that you see before you. I think that it is not a bad deal to regulate the ozone, from the point of view of the nation, but it is not an overwhelmingly good deal. That is the best way to describe it.

This morning we have heard criticisms regarding how EPA did its calculations, particularly concerning mortality evaluations and that EPA picked a course that, in fact, would put a high benefit there. Although we heard something different from a couple of the panelists here, the high end of the ranges tried to be reasonable, in terms of a value of mortality that is generally accepted by the economics community. We are looking at a value of life of $4.8 million. We have used the assumptions of our critics in the low end of these two estimates. One assumption is to completely delete, in the case of ozone, any mortality estimates, so the bottom figure here is not presuming there is any ozone mortality whatsoever from the exposure to ozone. However, you heard George Thurston say earlier that the scientists claim there is mortality from exposure to ozone. In the case of the PM, what we have done is try to come up with a different method of evaluation that looks at the value of life years saved. Although, it significantly reduces the value of a life as calculated here, the method demonstrates that even though we use the most conservative assumption for the value of life, it still turns out to be a good deal in terms of the regulation of PM.

I would like to explain some caveats and limitations. This analysis, by definition, is loaded with assumptions, caveats and uncertainties. What we try to do within our analysis and with some success is to be as transparent as possible for people to understand what those limitations are. In general, I agree with my critics that there are shortcomings to these analyses, but we try to put together analyses that are as good as science allows. There are several cases where we do not have enough information. In the case of the emissions inventory, you have already heard that there is not much monitor-

ing data for $PM_{2.5}$.[8] EPA had our expert scientists calculate ratios for $PM_{2.5}$ and PM_{10} to help, not only the modeling for the economic analysis, but also for the setting of the standard itself. The scientists think that it is a reasonable approximation, at least the one we relied on. Time will tell whether that is correct.

Similarly, you heard John Vandenberg say that we must look at models of pollutants, one at a time. Let us look at the ozone model. Let us look at the PM model. Let us look at the SO_2 model. In the future, we hope that there will be a model that looks at the interaction of all the pollutants. That will have a great impact on the costs and benefits because then you can look at the impact of the joint controls.

We now know, that if a certain type of control is placed on a utility, it eliminates both ozone and PM from the atmosphere. In our analysis, we tried to account for that interaction, but our ability to model that interaction.

In addition, there are many categories of benefits that we know ozone and PM have an effect on that we have no way of putting a dollar value on. I believe that John talked about the decrease of lung function from exposure to ozone. What is the value of losing 10% of lung function? No one has a formula to place a value on that. Hopefully, in the future, we will know whether or not it has a value or whether it is important. Right now, we do not know what it really means.

In closing, I want to talk about a point that was raised earlier in the presentation, about UVB and the issue of whether or not EPA should be looking at the disadvantages of controlling ozone and the increase in skin cancer that result from controlling the ozone level of air which we breathe. We took a look at that within the body of economic analysis and tried to come up with estimates. The bottom line, when meteorologists and health scientists review the numbers, is that the uncertainties surrounding the results of the modeling are so large that the resulting numbers are not trustworthy. In

8. *See* U.S. EPA Office of Air & Radiation, Office of Air Quality Planning and Standards Fact Sheet (last modified July 17, 1998) http://ttn.www.rtpnc.epa.gov/naaqsfin/impfac.htm.

the next few years, we are going to try to address that. While the standard itself cannot complete a risk-risk tradeoff, within the economic analysis, we can mention it and it should appear the next time the standard comes up.