# Setting Air Quality Standards: Science and the Crisis of Accountability

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*The Clean Air Act (CAA) directs the Administrator of the Environmental Protection Agency (EPA) to set air quality standards based on the latest scientific evidence. Courts have interpreted this language to limit consideration of other factors. Science alone, however, cannot dictate air quality standards because science cannot dictate how many premature deaths or asthma attacks are acceptable nor how precautionary the EPA should be in the face of uncertain scientific evidence. This Article closely examines the EPA's 2006 air quality standard for particulate matter and explains that the EPA Administrator rationalized his choice of a standard in entirely scientific terms. Such an explanation necessarily leaves out important nonscientific factors, leading to a crisis of accountability. Congress avoided making the critical value judgments by directing the EPA to set a standard based on science, and the EPA avoided explaining the critical value judgments it made by explaining its choice in entirely scientific terms. This Article concludes that Congress should fix this problem by giving the EPA explicit direction on how to weigh competing values and requiring the EPA to explain its value judgments.*



## I. INTRODUCTION

Lately, things have been a little bit unusual in the world of air quality standards. While never uncontroversial, until 2006 National Ambient Air Quality Standards (NAAQS) promulgated under the Clean Air Act (CAA) were largely set through a dialogue between

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Environmental Protection Agency (EPA) expert staff and a Congressionally mandated scientific advisory committee.[1] While the Administrator of the EPA determined the final standard, he generally did not participate in this dialogue and chose a standard within the range suggested by the staff-scientific advisory board dialogue.[2]

In 2006, this all changed. The EPA Administrator, for the first time, set a standard for particulate matter pollution that was strongly objected to by the scientific advisory committee.[3] Controversy and accusations of political bias erupted over how the Administrator could claim his decision was based on science when he failed to follow the recommendation of the scientists.

Then, on March 13, 2008, the *Washington Post* reported that President Bush himself had chosen the final ozone pollution standard promulgated on that day.[4] This report is supported by language in the EPA's preamble to the rule, which discusses the President's participation.[5] The President's involvement was unprecedented, and environmentalists balked. The statute, they argued, required that standards have a scientific basis and that they be set by experts, not the political determinations of the President.[6]

The debate precipitated by these unprecedented actions highlights a major flaw in the construction of the air quality standards mandate of the CAA and its interpretation by the EPA and the courts. The CAA requires the Administrator of the EPA to set NAAQS for each air pollutant at a level "the maintenance of which in the judgment of the Administrator, based on [the latest scientific knowledge] and allowing an adequate margin of safety, [is] requisite to protect the public health."[7] This language anticipates that there is a level of each pollutant that is requisite to protect the public health and that this level can be discerned based on scientific knowledge. Congress's anticipation that science could provide

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1. JAMES E. MCCARTHY, CONG. RESEARCH SERV., AIR QUALITY STANDARDS AND SOUND SCIENCE: WHAT ROLE FOR CASAC? (2007), *available at* http://ncseonline.org/nle/crsreports/07Oct/RL33807.pdf.

2. *Id.* at 8.

3. *Id.* at 2.

4. Juliet Eilperin, *Ozone Rules Weakened at Bush's Behest: EPA Scrambles To Justify Action*, WASH. POST, Mar. 14, 2008, at A1.

5. EPA, Final Rule: National Ambient Air Quality Standards for Ozone, 73 Fed. Reg. 16,436, 16,497 (Mar. 27, 2008) (to be codified at 40 C.F.R. pts. 50 & 58) ("On March 11, 2008, the *President* concluded that, consistent with Administration policy, added protection should be afforded to public welfare by strengthening the secondary ozone standard and setting it to be identical to the new primary standard . . . ." (emphasis added) (internal quotation marks omitted)).

6. *See* Eilperin, *supra* note 4.

7. Pub. L. No. 91-604 § 4(a) (1970) (codified at 42 U.S.C. § 7409 (1970)).

answers is further supported by its creation of a scientific advisory committee empowered not only to advise the Administrator as to the relevant science, but also to make recommendations as to specific standards. The major flaw in the construction of this section of the CAA is that science alone cannot dictate a standard. Further, its interpretation by the EPA and courts leads the EPA to explain its standards in scientific terms and courts to bar the EPA from consideration of nonscientific factors.

Science alone cannot tell the Administrator what standard is "requisite" because what is "requisite" depends on what one considers a significant health risk. And what one considers a significant health risk in turn depends on a value judgment as to how many premature deaths or asthma attacks or other adverse health endpoints are "acceptable." This value judgment will often be influenced by the cost of preventing the adverse health outcome. For most pollutants there is no completely safe level except zero; however, setting a standard at zero is prohibitively expensive (and probably even impossible given natural background levels of most pollutants). Any choice above zero requires tradeoffs between benefits and costs. For this reason, as explained in Part III of this Article, science alone cannot dictate a standard and value judgments are inevitable.

Yet the construction of the CAA, as interpreted by the Supreme Court of the United States, limits the EPA Administrator to scientific considerations when he chooses a standard. Because science alone cannot determine the standard and the Administrator cannot discuss value judgments, he turns to scientific uncertainty to explain his choice. Part IV examines the rationale for the standard chosen in the recent particulate matter regulation to demonstrate that although the standard cannot be chosen based on science alone, the EPA explains its choice of a standard in entirely scientific terms. Part IV also discusses the recent United States Court of Appeals for the District of Columbia Circuit decision vacating the EPA's standard and demonstrates that the court also explained its decision in scientific terms.

Congress's impossible mandate, combined with judicial interpretations, thus creates a serious problem of accountability, discussed in Part V. Congress is not accountable for the standard because it is able to hide behind this impossible mandate. The EPA Administrator is also not accountable for the standard because he explains his choice of a particular standard in entirely scientific terms, eliding the value judgments he inevitably makes. This Article concludes that Congress and/or the courts should fix this accountability problem. Congress must

fix it by explicitly allowing consideration of nonscientific factors in setting air quality standards. But Congress, as the more democratically accountable branch, should not just authorize cost-benefit analysis as the EPA has suggested. After all, efficiency is not necessarily the appropriate goal where one person's pollution harms another, and an authorization to use cost-benefit analysis would still leave the critical value judgments to the EPA. Instead, Congress should give the EPA substantive guidance as to how to make the necessary value judgments. This guidance would increase both Congress's and the EPA Administrator's accountability for the chosen standard. If Congress fails to act, the second-best solution is for the courts to recognize that the standards cannot be set based on science alone and allow, and even require, the EPA Administrator to explain the true reasons for his choice of a standard. This would at least increase the EPA Administrator's accountability.

## II. BACKGROUND

### *A. Particulate Matter*

Particulate matter is the term for solid or liquid particles found in the air.[8] Particulate matter is classified by size; for example, $PM_{2.5}$ designates particles that are less than 2.5 microns in diameter. Because particles originate from a variety of sources (dust, diesel vehicles, woodstoves, power plants, etc.), their chemical and physical compositions vary widely.[9] Particulate matter can be directly emitted or can be formed in the atmosphere when gaseous pollutants such as sulfur dioxide and nitrogen oxides react to form fine particles.[10] Because of its size, $PM_{2.5}$ can bypass the body's defense system and become deposited deep into the lungs, and can even be absorbed into the bloodstream or remain embedded in the lungs for long periods of time.[11] Studies have linked particulate matter exposure to premature death in people with heart or lung disease, decreased lung function, irregular heartbeat, nonfatal heart attacks, development of chronic bronchitis, and asthma exacerbation.[12]

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8. 52 Fed. Reg. 24,634, 24,635 (July 1, 1989) (to be codified at 40 C.F.R. pt. 50); EPA, Particulate Matter: Basic Information, http://www.epa.gov/oar/particlepollution/basic.html (last visited Feb. 14, 2009).

9. EPA, *supra* note 8.

10. *Id.*

11. *See* EPA, Particulate Matter: Health and Environment, http://www.epa.gov/oar/particlepollution/health.html (last visited Feb. 14, 2009).

12. *Id.*

### *B. Statutory and Judicial Background—The Clean Air Act*

Responding to evidence that air pollution, including particulate matter, was causing serious adverse health effects, Congress passed the CAA in 1970. With respect to ambient air pollutants like particulate matter, the CAA set up a multistep process for regulation. In the modern version of the statute, the EPA Administrator is first directed to publish a list of air pollutants, "emissions of which, in his judgment, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare."[13]

Next, the Administrator is directed to issue air quality criteria that "shall accurately reflect the latest scientific knowledge useful in indicating the kind and extent of all identifiable effects on public health or welfare which may be expected from the presence of such pollutant in the ambient air, in varying quantities."[14] Finally, simultaneous to the issuance of the air quality criteria, the Administrator is directed to publish proposed national primary and secondary ambient air quality standards for that pollutant.[15] Primary standards should be set at a level "the attainment and maintenance of which in the judgment of the Administrator, based on [the] criteria and allowing an adequate margin of safety, are requisite to protect the public health."[16] NAAQS must be revised periodically in the same manner in which they were promulgated.[17]

The Administrator is also required to appoint an "independent scientific review committee."[18] The committee is then required to "complete a review of the criteria published under section [108] and the national primary . . . air quality standards . . . and shall recommend to the Administrator any new national ambient air quality standards and revisions of existing criteria and standards as may be appropriate."[19] If the Administrator chooses a standard different than the standard

13. 42 U.S.C. § 7408(a)(1)(A) (2006).
14. *Id.* § 7408(a)(2).
15. *Id.* § 7408(b)(1).
16. *Id.* § 7409(b)(1).
17. *Id.* § 7409(b)(2).
18. *Id.* § 7409(d)(2)(A).
19. *Id.* § 7409(d)(2)(B). The committee is also directed to advise the Administrator of areas in which additional knowledge is required to appraise the adequacy and basis of standards, describe research efforts necessary to provide the required information, give advice on the relative contribution to air pollution of natural and anthropogenic activity, and advise the Administrator of any adverse public health, welfare, social, economic, or energy effects which may result from various strategies for attainment and maintenance of the NAAQS. *Id.* § 7409(d)(2)(C).

recommended by the scientific advisory board, the Administrator must explain his reasoning.[20]

The statutory language is hardly crystal clear. What do "adequate margin of safety" and "requisite to protect the public health" mean? What does "judgment" mean? In fact, the American Trucking Associations convinced the United States Court of Appeals for the D.C. Circuit that this provision of the statute effected an unconstitutional delegation of authority from Congress to the EPA because of the large degree of discretion conferred upon the Administrator.[21] The Supreme Court, however, disagreed,[22] and over time, courts have given some content to the statutory language.

The D.C. Circuit has explained that Congress "specifically directed the Administrator to allow an adequate margin of safety to protect against effects which have not yet been uncovered by research and effects whose medical significance is a matter of disagreement."[23] Further, the court clarified that "the use of the term . . . was . . . meant by Congress to take into account and compensate for uncertainties and lack of precise predictions in the area of forecasting the effects of toxic pollutants."[24] In terms of how to treat uncertainties, the D.C Circuit has stated, "as we read the statutory provisions and the legislative history, Congress directed the Administrator to err on the side of caution in making the necessary decisions."[25] The choice between various possible approaches to incorporating an adequate margin of safety "is a policy choice of the type that Congress specifically left to the Administrator's judgment."[26]

The Supreme Court has explained that "requisite" means "not lower or higher than is necessary—to protect the public health with an adequate margin of safety."[27] The Court has further directed the EPA to set the standard as follows:

> "[B]ased on" the information about health effects contained in the technical "criteria" documents . . . , to identify the maximum airborne concentration of a pollutant that the public health can tolerate, decrease the concentration to provide an "adequate" margin of safety, and set the

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20. *Id.* § 7607(d)(3).
21. Am. Trucking Ass'ns v. EPA, 175 F.3d 1027, 1033 (D.C. Cir. 1999).
22. Whitman v. Am. Trucking Ass'n, 531 U.S. 457, 473-74 (2001).
23. Lead Indus. Ass'n v. EPA, 647 F.2d 1130, 1154 (D.C. Cir. 1980).
24. Envtl. Def. Fund v. EPA, 598 F.2d 62, 81 (D.C. Cir. 1978) (quoting Khristine L. Hall, *The Control of Toxic Pollutants Under the Federal Water Pollution Control Act Amendments of 1972*, 63 IOWA L. REV. 609, 629-30 (1978)).
25. *Lead Indus. Assoc.*, 647 F.2d at 1155.
26. *Id.* at 1162.
27. *Whitman*, 531 U.S. at 476.

standard at that level. Nowhere are the costs of achieving such a standard made part of that initial calculation.[28]

### *C. Regulatory Background—Previous PM NAAQS*

The EPA first issued NAAQS for particulate matter in 1971.[29] What is fascinating about this regulation is that in twenty pages of Federal Register text, the EPA promulgated and explained NAAQS for six different pollutants.[30] Expounding upon its charge, the EPA stated, "[T]he Clean Air Act, as amended, does not permit any factors other than health to be taken into account in setting the . . . standards . . . . In reviewing the proposed standards, the [EPA] limited its consideration to comments concerning the validity of the scientific basis of the standards."[31] The EPA then explained that while the science was imperfect, the standards were set to protect people from the adverse effects suggested by all unrefuted available data, with an adequate margin of safety.[32] The primary standard for the annual mean allowable emissions for all particulate matter, regardless of size (total suspended particles), was 75 $\mu g/m^3$ (micrograms per cubic meter).[33]

In 1987, the EPA revised this regulation.[34] To explain its choice of a standard, the EPA cited to court cases and stated that the adequate margin of safety requirement was intended to address uncertainties associated with inconclusive scientific information and potential hazards not yet discovered.[35] The EPA also stated, based on the D.C. Circuit's opinion, that "[t]he selection of any particular approach to providing an adequate margin of safety is a policy choice left specifically to the Administrator's judgment."[36] In its rationale, the EPA acknowledged significant uncertainties in the quantitative data.[37] Consequently, the EPA looked to qualitative data on health effects in order to determine an adequate margin of safety.[38] Because smaller particles were of greater concern, the EPA decided to regulate particles whose diameter was less than 10

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28. *Id.* at 465.
29. National Primary and Secondary Ambient Air Quality Standards, 36 Fed. Reg. 8186, 8186 (Apr. 30, 1971) (to be codified at 40 C.F.R. 410).
30. *Id.*
31. *Id.*
32. *Id.*
33. *Id.* at 8187.
34. Revisions to the National Ambient Air Quality Standards for Particulate Matter, 52 Fed. Reg. 24,634, 24,634 (July 1, 1987).
35. *Id.* at 24,635.
36. *Id.*
37. *Id.*
38. *Id.* at 24,644-45.

microns, or PM10, instead of all total suspended solids as it had in 1971.[39] The EPA set the annual primary PM10 standard at 50 $\mu g/m^3$.[40]

The next time the EPA revised the particulate matter regulation was on July 18, 1997, in response to a court-ordered settlement.[41] The regulation, solely for particulate matter, consumed 107 pages of the Federal Register. In response to evidence that even smaller particles had effects of concern, the EPA split its regulation into two parts—one for particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) and one for PM10.[42] When it chose a final standard, the EPA extensively discussed a staff-generated risk assessment, which it concluded supported lowering the standard.[43] Risk assessments estimate likely risks below levels at which they can be positively demonstrated by epidemiological evidence. For $PM_{2.5}$, the EPA set the annual mean standard at 15 $\mu g/m^3$.[44]

The treatment of science and policy in the evolution of the EPA's particulate matter regulation is noteworthy. In 1971, the EPA insisted that its decision was solely based on science.[45] In 1987 and 1997, the EPA stated that the final decision was a "policy choice" left specifically to the Administrator.[46] At the same time, the EPA continued to explain its choice of a standard exclusively in scientific terms.[47] An explanation made in exclusively scientific terms necessarily leaves out significant bases for the decision because science alone cannot set the standard.

## III. SCIENCE ALONE CANNOT SET NAAQS

Congress faces no easy task when it legislates in the environmental arena. Professor Richard Lazarus describes four reasons for the particularly difficult and adversarial nature of environmental lawmaking: (1) the moralistic and spiritual quality of many of the arguments in favor of environmental protection; (2) the tremendous complexity of ecosystems, and, consequently, the great scientific uncertainty associated with our understanding of the relationship of environmental factors to human health; (3) the temporal gap between the costs of environmental

39. *Id.*
40. *Id.* at 24,634.
41. National Ambient Air Quality Standards for Particulate Matter, 62 Fed. Reg. 38,652 (1997) (codified as 40 C.F.R. § 50 (2007)).
42. *Id.*
43. *Id.* at 38,656.
44. *Id.* at 38,655.
45. *See* National Ambient Air Quality Standards, 36 Fed. Reg. 8186 (Apr. 30, 1971) (to be codified at 42 C.F.R. pt. 410).
46. *See* Revisions to the National Ambient Air Quality Standards for Particulate Matter, 52 Fed. Reg. 24,634 (July 1, 1987) (to be codified at 40 C.F.R. pt. 50); 62 Fed. Reg. 38,652.
47. *See* 62 Fed. Reg. 38,652.

controls, which are immediate, and the resulting benefits, which are not; and (4) the depth of change in existing industrial practices and current American lifestyles necessary to realize significant improvement in environmental quality.[48]

Consistent with a widespread sentiment in favor of environmental protection, Congress passed a series of dramatic and uncompromising environmental statutes in the 1970s but did not make any meaningful effort to bridge the gap between the nation's aspirations for environmental protection and its technological, economic, and cultural capacity for change.[49]

In particular, the environmental legislation of the 1970s did not anticipate the scientific complexity of environmental problems.[50] Nor did it appear to anticipate the limitations of science in environmental decision-making. For example, the Endangered Species Act required the Secretary of the Interior to make decisions about listing animal species based "*solely* on the best available science."[51] The Fish and Wildlife Service, however, must determine which species to list through innumerable decisions that cannot be based *solely* on science, starting with how to define the term "species."[52] Rather than shying away from science, Congress has more likely relied too heavily on the scientific enterprise to guide lawmaking.[53]

There are at least two different kinds of questions in setting science-based standards that are not answerable by science alone. The first kind are "trans-science" questions that involve both science and policy judgments.[54] The National Research Council, a branch of the National Academy of Sciences, has identified a whole range of trans-science questions involved in setting science-based standards.[55] Such trans-science questions include the relative weights that should be given to studies with differing results (should positive results outweigh negative

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48. Richard J. Lazarus, *The Neglected Question of Congressional Oversight of EPA:* Quis Custodiat Ipsos Costudes *(Who Shall Watch the Watchers Themselves)*, 54 LAW & CONTEMP. PROBS. 205, 221-22 (1991).

49. *Id.*

50. *Id.*

51. Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U. L.Q. 1029, 1051 n.19 (1997) (emphasis added).

52. *Id.* at 1117.

53. Wendy E. Wagner, *Congress, Science, and Environmental Policy*, 1999 U. ILL. L. REV. 181, 184 (1999).

54. COMM. ON THE INSTITUTIONAL MEANS FOR ASSESSMENT OF RISKS TO PUB. HEALTH, NAT'L RESEARCH COUNCIL, RISK ASSESSMENT AND THE FEDERAL GOVERNMENT: MANAGING THE PROCESS 29-33 (1983).

55. *Id.*

results if the studies that yield them are comparable?), what level of statistical significance should be required for results to be considered positive, and what dose-response models should be used to extrapolate from observed doses to other potential dose levels.[56]

A common trans-science question in risk regulation is what uncertainty factor to use. The scientific data available to address the risks posed by a pollutant will never be derived from a study that precisely mimics real world conditions. For example, the available information for the risks of many chemicals may only tell us about the effect of that chemical on animals, but for regulatory purposes we are interested in its effect on humans. Or the available information may be from a study of a population of adults, but for regulatory purposes we are also concerned about the effect of the pollutant on children. To take account of the uncertainty inherent in basing a standard on data that does not precisely mimic the regulatory conditions, regulators incorporate an uncertainty factor. For example, if studies show that there is a risk posed to adults when they are exposed to 0.1 μg/ml of a certain pollutant, regulators may multiply this number by an uncertainty factor of 10 to produce a standard of 0.01 μg/ml of that pollutant in order to adequately protect children. Or they may choose an uncertainty factor of 3 to produce a standard of 0.03 μg/ml. The choice of which uncertainty factor to use depends both on scientific factors, such as any information on how great the differences will be in the response of adults and children, and pure policy factors such as how precautionary (or conservative) the regulatory agency desires to be. Because of these trans-science questions, which require independent scientific and policy judgment, two scientists, properly applying the scientific method, could arrive at divergent conclusions based on the exact same data.[57]

Other questions that are necessary to set science-based standards, but are plainly unanswerable by science alone, are those that involve basic value choices, such as how many increased deaths or decreased IQ points should be considered significant enough to alter a standard. These questions may be informed by science (for example, science may help to explain the consequences of a decreased IQ), but are more purely values questions. In his article, *The Irrational National Air Quality Standards*, James Krier explains that any time an Administrator chooses to act or not act in revising a standard, valuations will necessarily be made:

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56. *Id.*

57. Alyson C. Flournoy, *Legislating Inaction: Asking the Wrong Questions in Protective Environmental Decisionmaking*, 15 HARV. ENVTL. L. REV. 327, 365-66 (1991).

> In the practical context of determining air quality standards . . . implicit valuations are necessarily made. The choice of a given standard, made through collective action, always reveals some conception and balancing of costs and benefits: A slack standard, with low control costs, is rejected as insufficient; a tight standard, with high control costs, is rejected as too expensive. In the process, an implicit value is attached to those effects not avoided by the more stringent standard.[58]

The EPA Administrator implicitly values both the benefit of the avoided adverse health outcomes and the costs of compliance when he chooses a standard.

Congress's science-based mandates to the agencies generally elide these two types of questions that simply cannot be answered by science alone. Recall that Congress required the EPA Administrator to set the NAAQS based on the criteria (i.e., scientific evidence) and provided for no other considerations. Congress's failure to acknowledge that science, standing alone, cannot resolve difficult environmental policy problems has enormous costs. Agencies are burdened with numerous difficult policy choices, but are at the same time restricted in their policy deliberations to predominantly scientific factors.[59] This hinders democratic deliberation on important issues, leading agencies to mask value judgments that would be informed by public debate as science judgments.[60]

Professor Wendy Wagner has explained how the unrealistic scientific mandates in environmental legislation have led to a "science charade" where agencies exaggerate the contributions made by science in setting standards to avoid accountability for the underlying policy decisions.[61] She suggests that major policy decisions (of the type this Article has described as the second kind of question) are simply described as "agency judgments" or "health policies" with no elaboration among hundreds of pages of agency explanations that give the appearance of resolving the questions through science.[62] Wagner describes a range of incentives for agencies to engage in this "science charade."[63] First, there are political incentives because the public demands both a strong economy and no risks from pollutants, and

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58. James E. Krier, *The Irrational National Air Quality Standards: Macro- and Micro-Mistakes*, 22 UCLA L. REV. 323, 331-32 (1974-1975).

59. Wagner, *supra* note 53, at 203.

60. *Id.* at 264.

61. Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1617 (1995).

62. *Id.* at 1650-67.

63. *Id.* at 1650-71.

scientific explanations help to conceal the underlying social compromise and confer greater legitimacy upon chosen standards.[64] Second, there are legal incentives, including science-based legislative mandates, courts that demand "substantial evidence," and a greater likelihood of surviving judicial review if an explanation is highly technical.[65]

Such a "science charade" may be particularly true of NAAQS decisions, which involve pollutants with no known level below which no adverse health effects remain. Recall the Supreme Court's instruction to the EPA to "identify the maximum airborne concentration of a pollutant that the public health can tolerate, decrease the concentration to provide an 'adequate' margin of safety, and set the standard at that level."[66] If only it were that simple. Instead of identifying a "maximum airborne concentration of a pollutant that the public health can tolerate" (i.e., a threshold below which no health effects occur), the evidence suggests a continuum of effects at varying levels of exposure to pollutants, such that there are potentially adverse health effects at any number greater than zero.[67] The statute, however, seems to contemplate a specific "safe" level, stating that standards shall be set at a level "the attainment and maintenance of which in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health."[68] The statutory prescription and judicial instruction, combined with the evidence that there is no particular "safe" level forces the agency to choose a point along the continuum. It is impossible to decide where to stop along this continuum without factoring in value judgments about what effects are significant. Setting the standard at zero, the level at which we may be sure that adverse health effects will not occur, would be unacceptable both because it would be impossible (natural forces also create particulate matter) and because it would have huge economic ramifications. Setting the standard any higher, though, necessarily requires a balancing of values.

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64. *Id.* at 1651-54.
65. *Id.* at 1653-67.
66. Whitman v. Am. Trucking Ass'ns, 531 U.S. 457, 465 (2001).
67. Joseph M. Feller, *Non-Threshold Pollutants and Air Quality Standards*, 24 ENVTL. L. 821, 824-25 (1994).
68. 42 U.S.C. § 7409(b)(1) (2000).

## IV. NEVERTHELESS, THE ADMINISTRATOR DESCRIBES HIS CHOICE OF A STANDARD IN EXCLUSIVELY SCIENTIFIC TERMS: THE 2006 PARTICULATE MATTER REGULATION

Consistent with Congress's avoidance, the EPA Administrator does not explain his choice of a standard in terms of these values. Instead of explaining how he weighs conflicting values, the EPA Administrator couches his choice in terms of scientific uncertainty. While science can demonstrate no safe level and there are potentially adverse health effects all the way down to zero, science has also only affirmatively found health effects in populations at levels significantly above zero.[69] This gap in knowledge creates uncertainty about the presence of health effects and their significance at lower levels. Uncertainty "can serve as a veil that masks or softens the difficult legal and policy issues that would have to be faced if all of the scientific questions were answered and statistical risks had to be squarely addressed."[70] In other words, uncertainty based on lack of knowledge of the level at which no adverse effect occurs allows the EPA to base its decision on a lack of understanding of the risks rather than on a decision about what level of risk is acceptable. The EPA necessarily makes value choices about how precautionary it wants to be, however, when it decides where to set the standard in the face of a lack of understanding of the risk.

The recent particulate matter regulation provides a good example of just how the EPA couches value judgments in purely scientific terms. On October 17, 2006, the EPA promulgated a new particulate matter regulation in response to a court-ordered schedule.[71] In this regulation, the EPA Administrator, Stephen Johnson, decided to retain the previous annual standard of 15 $\mu g/m^3$ for $PM_{2.5}$.[72] This decision was highly controversial, in large part because it was the first time the EPA had chosen a standard that was strongly opposed by its statutorily created science advisory board, the Clean Air Scientific Advisory Committee (CASAC).[73]

In its 2006 regulation, the EPA acknowledged that its determination was ultimately a policy decision, stating, "[T]he selection of any particular approach to providing an adequate margin of safety is a policy

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69. *See, e.g.*, National Ambient Air Quality Standards for Particulate Matter, 71 Fed Reg. 61,144 (Oct. 17, 2006) (to be codified at 40 C.F.R. pt. 50).

70. Feller, *supra* note 67, at 838.

71. 71 Fed. Reg. at 61,144.

72. *Id.* at 61,144. In this regulation, EPA also reduced the allowable twenty-four-hour mean for $PM_{2.5}$ from 65 µg/m3 to 35 µg/m3. *Id.*

73. MCCARTHY, *supra* note 1, at 7.

choice left specifically to the Administrator's judgment," yet explained its decision in exclusively scientific terms.[74] The EPA opened its explanation for retaining the 15 $\mu g/m^3$ standard by stating, "[T]he Administrator relied upon evidence from the long-term exposure $PM_{2.5}$ studies as the principle basis for selecting the proposed level of an annual standard."[75] The importance of this sentence is not immediately clear to the reader, but it is completely determinative of the final standard.

The statement signifies that in choosing a standard, the Administrator relied only on the "evidence," which means he relied only on the epidemiological studies and did not rely on the risk assessment. The statement also signifies that the Administrator decided only to rely on long-term studies, and consequently did not rely on short-term studies. In addition, it becomes clear later in the explanation that even within the long-term studies, the Administrator decided to rely more heavily on the mortality studies, which means he relied less on the morbidity studies. And even within the long-term mortality studies, he decided to rely on some of their conclusions and not others.[76] This opening sentence is determinative because it is the risk assessment, the short-term studies, and the long-term morbidity studies that indicate that there are adverse health effects below 15 $\mu g/m^3$. Thus, it was the Administrator's choice of which information on which to rely that ultimately determined the standard.

The Administrator explained his decision to rely on certain scientific information and to disregard other scientific information largely based on scientific uncertainty. With respect to the risk assessment, which indicated adverse health effects were likely at levels lower than those positively demonstrated by the epidemiological studies, the Administrator explained that "[i]n considering the risk assessment presented in the Staff Paper, [he] noted that the assessment contained a sensitivity analysis but not a formal uncertainty analysis, making it difficult to use the risk assessment to form a judgment of the probability of various risk estimates."[77] The Administrator explained all of the reasons why he believed the risk assessment was too uncertain to use, and stated that he believed it "mask[ed] the increasing uncertainty . . . that exists as lower levels are considered."[78] He concluded, "the risk assessment has important limitations as a basis for setting a standard

74. 71 Fed. Reg. at 61,145.
75. *Id.* at 61,172.
76. *Id.* at 61,175.
77. *Id.* at 61,155.
78. *Id.* at 61,168.

level . . . because the available studies do not resolve questions related to potential effect thresholds and because of other important uncertainties noted above."[79] Because he found the risks presented in the risk assessment overly uncertain, the Administrator decided that the risk assessment was not an appropriate basis on which to ground the standard.[80]

With respect to the short-term studies, which showed effects at annual levels below 15 $\mu g/m^3$, the Administrator found that they were not an appropriate basis for setting the annual standard. While he "[did] not disagree with CASAC's factual statements regarding the findings of the studies of short-term exposure effects," he believed it was more appropriate to use such studies for the short-term particulate matter standard than the annual one.[81] The CASAC's factual statements were that "studies indicat[e] that effects from short-term exposure of $PM_{2.5}$ persist in cities with annual $PM_{2.5}$ concentrations below the current standard."[82] Further, data suggested that even with a lower short-term standard, the adverse effects demonstrated by these studies would continue in many cities if the annual standard was not revised.[83] The Administrator, however, believed that "using evidence of effects associated with periods of exposure that are most closely matched to the averaging time of each standard is the most appropriate public health policy approach" and that the "evidence from short-term exposure studies is an appropriate basis for selecting any different level of the annual standard in this review than that selected based on the long-term exposure evidence."[84] Here, the Administrator admits that he is making a "public health policy" judgment, but explains it as though it is a scientific judgment as to the appropriateness of the evidence.

With respect to the long-term morbidity studies indicating adverse effects in children at annual levels of 13-14 $\mu g/m^3$, the Administrator wrote:

> The Administrator recognized that these are important new findings, indicating that long-term $PM_{2.5}$ exposure may be associated with respiratory morbidity in children. However, the Administrator also observed that this is the just study reporting decreased lung function growth, conducted in only one area of the country, such that further study

79. *Id.* at 61,174.
80. *Id* at 61,173-74.
81. *Id.* at 61,174.
82. *Id.*
83. Reply Brief of State Petitioners at 4-5, Am. Farm Bureau Fed. v. EPA, No. 06-1410 (D.C. Cir. Feb. 12, 2008).
84. 71 Fed. Reg. at 61,174.

> of this health endpoint in other areas of the country would be needed to increase confidence in the reported associations. Thus, the Administrator provisionally concluded that this study provides an uncertain basis for establishing the level of a national standard.[85]

Once again, the Administrator chose not to credit the new study in his determination because he found it too uncertain.[86] This is in contrast to the explanation for the first particulate matter NAAQS, in which the Administrator credited any evidence of adverse health effects that had not been specifically refuted.[87] Responding to comments that the long-term epidemiological studies on which the Administrator did rely provided direct evidence of premature mortality associated with annual levels of exposure below 15 $\mu g/m^3$, the Administrator wrote: "These commenters did not, however, discuss the uncertainties inherent in this type of epidemiologic study or the implications of these uncertainties on their interpretation of the results."[88]

The Administrator concluded by stating that he believed the uncertainties in the information that suggested a level lower than 15 $\mu g/m^3$ (i.e., the risk assessment, short-term studies, long-term morbidity studies, and even aspects of the long-term mortality studies) weighed against reaching a conclusion that the standard should be lowered.[89] Thus, the Administrator explained why he relied on certain data, and not on others, in entirely scientific terms.[90] And the Administrator determined the standard by deciding what data to rely on because all of the data on which he did not rely supported a finding of adverse effects below 15 $\mu g/m^3$.[91]

The Administrator acknowledged that the final decision was a policy decision, yet explained this policy decision in entirely scientific terms.[92] He stated, "In considering [the CASAC's] views, the Administrator noted that the appropriateness of setting an annual standard that would lower annual $PM_{2.5}$ . . . depends upon a policy judgment."[93] To explain the difference, however, he stated that he more heavily weighed the implications of the uncertainties associated with the Agency's quantitative risk assessment than the CASAC, disagreed with

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85. *Id.* at 61,172.
86. *Id.*
87. *See supra* notes 31-33 and accompanying text.
88. 71 Fed. Reg. at 61,175.
89. *Id.*
90. *Id.* at 61,172-77.
91. *Id.*
92. *Id.*
93. *Id.* at 61,173.

the CASAC that the risk assessment appropriately served as a primary basis for the decision, and instead felt that an evidence-based approach was the most appropriate public health policy approach.[94]

Thus, the Administrator concluded that a level of 15 $\mu g/m^3$ was an appropriate standard.[95] He also asserted that he "[could not] discern a clear line of scientific reasoning that would preclude [that level] from being a reasonable policy choice based on the most relevant available evidence."[96] Responding to commentators who suggested that the standard should be one standard deviation below that shown to be adverse in the long-term studies to provide an adequate margin of safety, he stated, "[W]hile that approach would by definition lead to a more precautionary standard, there is no basis for concluding that it is a more scientifically defensible approach. . . ."[97]

Administrator Johnson's decision to set the particulate matter standard at 15 $\mu g/m^3$ provoked an unusual rebuke by the CASAC.[98] In a September 29, 2006, letter, the CASAC wrote "to express . . . serious scientific concerns regarding the public health and welfare implications of EPA's final primary [NAAQS]."[99] The CASAC stated its concern "that EPA did not accept our finding that the annual $PM_{2.5}$ standard was not protective of human health and did not follow our recommendation for a change in that standard."[100] More specifically, the CASAC wrote, "[*T*]*here is clear and convincing scientific evidence that significant adverse human-health effects occur in response to . . . particulate matter exposures at and below 15 μg/m*$^3$."[101] Disagreeing with Administrator Johnson's treatment of the uncertainty in the risk assessment, the CASAC wrote, "While there is uncertainty associated with the risk assessment for the $PM_{2.5}$ standard, this very uncertainty suggests a need for a prudent approach to providing an adequate margin of safety."[102] The CASAC concluded:

> It is the CASAC's consensus scientific opinion that the decision to retain without change the annual $PM_{2.5}$ standard does not provide an "adequate margin of safety . . . requisite to protect the public health" (as required by

94. *Id.* at 61,173-74.
95. *Id.*
96. *Id.* at 61,175.
97. *Id.*
98. *See* Letter from Seven CASAC Members to Stephen L. Johnson, Adm'r of the EPA (Sept. 29, 2006), *available at* http://www.epa.gov/sab/pdf/casac-ltr-06-003.pdf (commenting on CASAC Recommendations Concerning the Final NAAQS for Particulate Matter).
99. *Id.* at 1.
100. *Id.*
101. *Id.*
102. *Id.* at 2.

> the Clean Air Act), leaving parts of the population of this country at significant risk of adverse health effects from exposure to fine [particulate matter].[103]

Finally, the CASAC pointed out that its recommendations to lower the standard "were consistent with the mainstream scientific advice that EPA received from virtually every major medical association and public health organization that provided input," and that to their knowledge, no science, medical, or public health group disagreed with the CASAC's recommendations.[104]

Relying heavily on the CASAC's findings and conclusions, on February 24, 2009, the D.C. Circuit held that the EPA's 2006 $PM_{2.5}$ standard was, "in several respects, contrary to law and unsupported by adequately reasoned decisionmaking," and remanded the standard to the EPA.[105] The court stated that it gave "an 'extreme degree of deference to the agency when . . . evaluating scientific data within [the agency's] technical expertise'" and reviewed the agency's action to ensure it had "'articulated an adequate explanation for its action.'"[106] The court presented two reasons why the EPA's annual $PM_{2.5}$ standard was not supported by adequately reasoned decision making.[107]

First, the court concluded that the EPA failed to adequately explain why it was inappropriate to consider short-term studies when choosing the annual standard, and why the daily standard alone would provide an appropriate degree of protection from short-term exposures.[108] Merely asserting that short-term studies formed a more appropriate basis for the daily standard, the court chided, was not explanation enough.[109] "If, however, the EPA can adequately explain why studies of short-term effects are not relevant to setting an annual standard, then it may disregard those studies . . . ."[110] Second, the court rejected the Administrator's explanation that the study of respiratory morbidity in children was not an appropriate basis for the standard.[111] Recall that the EPA had found this study to be uncertain because it was the only study that found respiratory morbidity effects in children.[112] The court pointed

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103. *Id.*
104. *Id.*
105. Am. Farm Bureau Fed'n v. EPA, No. 06-1410, 2009 WL 437050, at *1 (D.C. Cir. Feb. 24, 2009).
106. *Id.* at *5 (quoting City of Waukesha v. EPA, 320 F.3d 228, 248 (D.C. Cir. 2003)).
107. *Id.* at *6-12.
108. *Id.* at *8, 10.
109. *Id.* at *8.
110. *Id.*
111. *Id.* at *11.
112. *See supra* notes 85-86 and accompanying text.

to a second study, which appeared to support the conclusion that respiratory morbidity effects occur in children at a level below 15 $\mu g/m^3$, and held that the EPA had not adequately explained why these two studies, taken together, did not indicate a significant public health risk.[113] In the court's view, "the EPA too hastily discounted the . . . studies as lacking in significance."[114] With respect to the EPA's rejection of the risk analysis, however, the court deferred, finding that the EPA had "considered all aspects of the problem [and] catalogued its concerns" that the risk assessment was an unreliable basis for the standard.[115]

## V. A PROBLEM OF ACCOUNTABILITY

The D.C. Circuit's decision is laudable for broadcasting that the "extreme degree of deference" afforded agencies when they evaluate scientific data is not blind deference.[116] Its import, however, is not immediately clear. At its most surface level, the decision merely requires the EPA to "adequately explain" why the evidence supporting a lower standard is not a reliable basis for setting the standard (i.e., why the evidence is too uncertain).[117] If all that the decision does is to take the EPA to task for its sloppy and incomplete analysis, it does little to address the core of the problem because the EPA's decision may then remain firmly rooted in a discussion of scientific uncertainty.

To the point, as discussed in Part IV, the Administrator's decision was based entirely on a discussion of scientific uncertainty. He failed, however, to explain why the uncertainties in the studies suggesting adverse health effects below 15 $\mu g/m^3$ should be weighed so heavily that only evidence from the most certain studies, in this case the long-term studies suggesting health effects above 15 $\mu g/m^3$, formed an adequate basis for the standard.[118] As the Administrator acknowledged, this is not an entirely scientific judgment.[119] Instead, it is a judgment as to the level of precaution the Administrator believed was appropriate. There was evidence of adverse health effects above 15 $\mu g/m^3$ with less uncertainty

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113. *Am. Farm Bureau Fed'n*, 2009 WL 437050, at *12 ("Viewed in isolation, of course, the studies are far from conclusive. Viewed together, however, the conclusion reached by the [EPA staff] seems the only reasonable one: the findings of the [two] studies are related and together indicate a significant public health risk.").

114. *Id.*

115. *Id.* at *14.

116. *See id.* at *5.

117. *See id.* at *15.

118. *See* National Ambient Air Quality Standards for Particulate Matter, 71 Fed. Reg. 61,144, 61,172-77 (Oct. 17, 2006) (to be codified at 40 C.F.R. pt. 50).

119. *Id.*

and evidence of adverse health effects below 15 $\mu g/m^3$ with greater uncertainty.[120] The Administrator did not explain how he decided where to stop on the uncertainty continuum.[121] His decision was necessarily grounded in value judgments about the appropriate level of precaution. How much precaution the Administrator believed was appropriate is almost surely grounded in his views of the benefits and costs of lowering the standard. If the court's decision merely requires a more complete explanation of why certain studies were as uncertain as the EPA asserts, it does not address such value decisions at all.

But the court's decision may do much more. While the court only requires the EPA to "adequately explain" its conclusions, the court certainly suggests that it believes that the evidence runs counter to the EPA's conclusions.[122] If the EPA cannot "adequately explain" its conclusion that the evidence is too uncertain to form a reliable basis for the standard, then presumably it would have to base its standard on this evidence and set a more protective standard.

An interpretation of the court's decision as suggesting that the EPA's uncertainty explanation is meritless opens up a host of possibilities, both hopeful and worrisome. On the hopeful side, the decision could call for the EPA to address the question of the significance of the risks head on.[123] If the EPA cannot bury its decision in a discussion of scientific uncertainty yet still believes that 15 $\mu g/m^3$ is the appropriate standard, then the EPA Administrator would have to explain his judgment in terms of the significance of the risk. Such an explanation would open a more honest dialogue about what level of health effects is acceptable—exactly what this Article advocates. What is more worrisome is that, like the EPA's rule, the court's decision is based entirely on a discussion of the scientific evidence and does not acknowledge that the decision of where to set the standard cannot be explained by reference to science.[124] If the court is making a judgment that the EPA's standard is not adequately protective, it couches this judgment in the same language that the EPA couches its judgment, in a discussion of the science alone.[125] Neither the EPA nor the court explains how it decided where the appropriate (or

120. *Id.*

121. *See id.*

122. *See* discussion *supra* note 113.

123. The court's statement that the two studies of respiratory morbidity in children "are related and together indicate a significant public health risk" suggests that the court is pushing the EPA away from a discussion of scientific uncertainty and towards a discussion of the significance of the risk. Am. Farm Bureau Fed'n v. EPA, 2009 WL 437050, at *12 (D.C. Cir. Feb. 24, 2009).

124. *See id.* at *6-12.

125. *See id.*

lawful) place to stop along the uncertainty continuum is. Thus, this fundamental value decision goes completely unexplained.

Why does this matter? Both Congress and the EPA, by obscuring value decisions in scientific mandates and explanations, avoid accountability for their value-laden decisions. And these are important value decisions. While of course uncertain, the EPA's regulatory impact analysis estimates that by choosing a standard of fifteen instead of fourteen, the Administrator may have allowed up to 11,000 additional premature deaths due to particulate matter pollution.[126] Congress avoids accountability for the decision by stating that the standard will be based on the science when science alone cannot dictate a standard.[127] Because setting the standard based upon the science is impossible in practice, the EPA's choice cannot be directly linked to Congressional guidance as to where to set the standard. Instead, Congress can only be held accountable for giving discretion to the Administrator to make the necessary value judgments. The Administrator avoids accountability by weighing values, lives, and costs, yet explains his decision entirely in scientific terms. Therefore, the public cannot assess the value judgments made.

This problem of accountability should be fixed. The best solution is for Congress to amend the statute both to allow the EPA to explicitly consider nonscientific factors and to give the EPA substantive guidance on how to weigh these values. This is the best solution because Congress has a "distinctive kind of accountability—the kind of accountability that comes from requiring specific decisions from a deliberative body reflecting the views of representatives from various states of the union."[128] It is this particular form of accountability that leads us to entrust Congress to make federal law and not give a general grant of authority to the President to make environmental law.[129] The EPA Administrator is accountable through the President,[130] but the EPA Administrator cannot replace the deliberation and compromise inherent in Congressional lawmaking.

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126. EPA, REGULATORY IMPACT ANALYSIS FOR PARTICULATE MATTER NATIONAL AMBIENT AIR QUALITY STANDARDS (Sept. 2006) 5, 5-85, *available at* www.epa.gov/ttn/ecas/ria.html.

127. Clean Air Act, 42 U.S.C. § 7408(a)(2) (2000).

128. Cass Sunstein, *Is the Clean Air Act Unconstitutional?*, 98 MICH. L. REV. 303, 335-36 (1999).

129. *Id.* at 339.

130. JERRY L. MASHAW, GREED, CHAOS, AND GOVERNANCE: USING PUBLIC CHOICE TO IMPROVE PUBLIC LAW 145-57 (1997).

In 2008, the EPA recommended that Congress amend the statute and set forth several principles to guide legislative change.[131] The principles urge that Congress "should allow decision-makers to consider benefits, costs, risk tradeoffs, and feasibility in making decisions about how to clean the air."[132] To a large degree, the EPA's suggestion makes sense. Congress should authorize the EPA to consider nonscientific factors in choosing a standard because these considerations are inevitable and the EPA will be more accountable if it is permitted to explain its actual reasons for choosing a particular standard. But in doing so, Congress need not, and should not, authorize the EPA to base its decision on a formal cost-benefit analysis. If it does, Congress still leaves the essential value choices to the EPA, such as how to value the benefit of a premature death or asthma attack averted.

Congress need not make its primary goal efficiency, the goal purportedly achieved through cost-benefit analysis. Instead, Congress should deliberate substantively on the end it wishes to achieve. For example, Congress may decide that it cares about the distributional effects of air pollution and that even if a cost-benefit analysis suggests that greater measures should not be taken, for distributional reasons it is unfair that certain segments of the population (people in the inner city, the elderly, and young children, who are all either more exposed or more susceptible to pollution) carry the burden of pollution while the entire population benefits from cheaper energy or products. If so, Congress could direct that even where the costs outweigh the benefits overall, the EPA should take steps to reduce pollution to protect susceptible groups by mandating more stringent standards than the cost-benefit analysis would support. Or Congress could decide that its primary goal is efficiency but that it thinks the EPA's current valuation of a premature death or asthma attack averted is either too high or too low. In this way, Congress would weigh in on the essential value choices required to choose a standard. Either way, Congress would be more accountable for the ultimate standard by making clearer how it values lives and how it views the distributional effects of pollution.[133]

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131. Press Release, EPA, EPA Strengthens Smog Standards To Better Protect Human Health and the Environment (Mar. 12, 2008), *available at* http://yosemite.epa.gov/opa/admpress.nsf/7ebdf4d0b217978b852573590040443a/325164c014b3b8538525740a00745786!OpenDocument.

132. *Id.*

133. While I believe that air quality standards should account for distributional effects and that the EPA does not always adequately value the benefit of averted adverse health effects, I believe even more strongly that Congress should make these value judgments in a way in which it may be held accountable.

If Congress does not act, the second-best solution is for courts to recognize that pollution standards cannot be set without consideration of values and costs and allow, and even require, the EPA to explain the value judgments it makes when choosing a specific standard. Since the explosion of the administrative state, Congress has often conferred an enormous degree of discretion upon Administrators to make law. To compensate for the fact that decisions made by Administrators are not made by the deliberative and democratically-accountable Congress, Congress and courts have set up a series of procedural requirements to ensure that agencies hear wide public comment and explain their decisions thoroughly.[134] These procedural requirements simply do not work when an agency is foreclosed from, or even allowed to avoid, explaining the true basis for its decision. The courts should not punish the EPA for admitting that it has considered nonscientific factors. Indeed, courts should require the EPA to go beyond scientific explanations and explain the value choices behind its decisions.[135] Only then will we achieve the type of second-best accountability that derives from true public participation and understanding of the actions agencies take.

## VI. CONCLUSION

Commenting on the emergence of the administrative state in 1938, James Landis argued that while there are organizational strengths in the administrative state, they do not

> "dispense with the ultimate necessity of arriving at some conclusion based upon conscious selection among available and competing postulates. When those postulates have so enlisted the loyalties and faiths of classes of people, the choice, to have that finality and moral sanction necessary for enforcement, must, as a practical matter, be made according to a method which resolves it as if it were one of power rather than one of judgment."[136]

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134. *See generally* Administrative Procedure Act, 5 U.S.C. §§ 551-559; Ethyl Corp. v. EPA, 541 F.2d 1, 33-37 (D.C. Cir. 1976) (taking a "hard look" at EPA's reasoning); Greater Boston Television Corp. v. FCC, 444 F.2d 841, 850-51 (D.C. Cir. 1970) (coining the phrase "reasoned decision-making"); Richard B. Stewart, *The Reformation of American Administrative Law*, 88 HARV. L. REV. 1669 (1975) (describing court movement toward procedural formalities for constraining administrative decisions).

135. In doing so, courts could perhaps better evaluate whether the EPA was following Congress's command to provide "an adequate margin of safety." 42 U.S.C. § 7409 (2006).

136. Marshall J. Breger, *Thoughts on Accountability and the Administrative Process*, 39 ADMIN. L. REV. 399, 402-03 (1987) (quoting J. LANDIS, THE ADMINISTRATIVE PROCESS 59 (1st ed. 1938)).

Landis's prescription is particularly relevant in the context of the air quality standards. For decades, Congress, the EPA, and courts have been treating the question of where to set air quality standards as a matter of technical judgment made through scientific expertise. In fact, while science informs the decision of where to set a standard, the more important factor is the value we ascribe to human health and life. Determining the value of human health and life cannot be based on a technical judgment, but must be resolved as a matter of power. Congress is the body we have entrusted to exercise this enormous power, and Congress should be accountable for this power by more explicitly directing the EPA in how to weigh the values inherent in setting air quality standards.