THE RISK IN TECHNOLOGY-BASED STANDARDS

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"Risk is the coin of the realm in environmental, health and safety regulation . . . ."[1]

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1. Gilbert S. Omenn, *Making Use of Cancer Risk Assessment*, 12 ISSUES IN SCI. & TECH. 29, 29 (1996).

I. INTRODUCTION

Over the past thirty years the judiciary has developed two related misconceptions about the "technology-based" standards adopted by the United States Environmental Protection Agency ("EPA" or "the Agency") that generally require all members of an industry to limit their releases of harmful pollutants by using particular pollution control technologies. First, some courts mistakenly believe that to set those standards EPA merely conducts a technocratic evaluation of the control technologies available to a given industry without making a policy-laden choice of whether the benefits offered by any candidate technology justify the costs to operate it.[2] Second, some judges incorrectly assume that EPA selects technology-based standards

2. *See infra* text accompanying notes 84-101 (discussing EPA v. Nat'l Crushed Stone Ass'n, 449 U.S. 64 (1980), Am. Iron & Steel Inst. v. EPA, 526 F.2d 1027 (3d Cir. 1975), and Tex. Oil & Gas Ass'n v. EPA, 161 F.3d 923 (5th Cir. 1998)). Scholars also have described technology-based standards, which EPA supposedly sets by simply determining which control method is "feasible," as distinct from standards that EPA sets by weighing both the costs and the benefits of regulation. *See, e.g.*, FRANK B. CROSS, ENVIRONMENTALLY INDUCED CANCER AND THE LAW 69, 81-93 (1989) [hereinafter ENVIRONMENTALLY INDUCED CANCER] (drawing distinction between "feasibility" analysis and "cost-benefit analysis"); Thomas O. McGarity, *Media-Quality, Technology, and Cost-Benefit Balancing Strategies for Health and Environmental Regulation*, 46 LAW & CONTEMP. PROBS. 159, 160 (1983) [hereinafter *Environmental Strategies*] (contrasting a technology-based regulatory approach with a "balancing" approach that considers costs and benefits). As discussed below, while a formal, monetized comparison of costs and benefits is not required in setting a technology-based standard, the question of whether a technology is "feasible" or "available" hinges on whether its costs are worth its benefits in some vague sense.

without taking into account the public health and environmental risks posed by the industrial facilities to be regulated.[3]

These misconceptions have led to seriously adverse consequences. EPA has been allowed to frustrate the goals of the Administrative Procedure Act ("APA") by shielding key aspects of its standard setting process from the judicial and public scrutiny so vital to maintaining the Agency's accountability.[4] EPA has successfully convinced courts not to give appropriate APA review to the Agency's calculations of a control technology's public health and environmental benefits, even though they were plainly evident in, and inherently necessary to, its rulemakings.[5] In addition, EPA has managed to hide from the citizenry its estimates of one factor—the toxicities of the pollutants at issue—that substantially affects the assessment of those public health and environmental benefits.[6]

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3. *See infra* text accompanying notes 173-85 (discussing Cement Kiln Recycling Coal. v. EPA, 255 F.3d 855 (D.C. Cir. 2001) and Sierra Club v. EPA, 353 F.3d 976 (D.C. Cir. 2004)). EPA's own statements suggest it does not take risk into account when setting technology-based standards. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants for Source Categories and for Coke Oven Batteries, 58 Fed. Reg. 57,898, 57,907 (Oct. 27, 1993) (to be codified at 40 C.F.R. pts. 9 & 63) ("[e]stimates of risk to the surrounding community simply do not play a role in the development of [technology-based standards]"); National Emission Standards for Hazardous Air Pollutants: Generic Maximum Achievable Control Technology (Generic MACT), 64 Fed. Reg. 34,854, 34,860 (June 29, 1999) (to be codified at 40 C.F.R. pt. 63) ("we do not consider health risks" when setting those standards).

Perhaps mirroring EPA's language, scholars similarly have described technology-based standards as not set "on the basis of health risks" and not taking into account "the magnitude of the health risks posed by the pollutant." Joseph M. Feller, *Non-Threshold Pollutants and Air Quality Standards*, 24 ENVTL. L. 821, 876-77 (1994). *See also* Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 106 [hereinafter *Triumph*] (describing technology-based standards as "environment-blind"). These claims by jurists, scholars, and even EPA are accurate, as discussed below, to the extent they suggest EPA does not make full, detailed, and precise assessments of the risks posed by a regulated entity, but overstate the case if they suggest public health and environmental risks are entirely irrelevant to the process of setting technology-based standards. *See infra* text accompanying notes 169-72.

4. *See infra* text accompanying notes 77-82 (discussing 5 U.S.C. §§ 553(b)-(c), 706(2) (2000) and 42 U.S.C. § 307(b), (d) (2000)).

5. *See infra* text accompanying notes 84-106.

6. *See infra* text accompanying notes 140-64. The industrial chemicals and other toxic substances released into the environment by vast numbers of manufacturers, agricultural operations, and other enterprises can cause a wide variety of adverse health effects to humans and to flora and fauna. *See* NATIONAL RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT: MANAGING THE PROCESS 9-10 (1983) (describing the increase, beginning in the late 1960s, of scientific evidence demonstrating that "suspect" chemicals may be causing cancer or other chronic health effects); David L. Eaton, *Scientific Judgment and Toxic Torts—A Primer in Toxicology for Judges and Lawyers*, 12 J.L & POL'Y 5, 5-6, 22-29 (2003) (discussing environmental factors, including exposure to chemical agents, as causes of disease); James Gustave Speth, *EPA Must Help Lead an Environmental Revolution in Technology*, 21 ENVTL. L. 1425,

This article will examine these issues in the context of two particular types of technology-based standards: the Clean Water Act's "BAT" standards, which require the members of regulated industries to restrict their discharges of water pollutants to levels reflecting the "best available technologies,"[7] and the Clean Air Act's "MACT" standards, which similarly limit emissions of air pollutants using the "maximum achievable control technologies."[8] Based on a careful examination of more than 100 regulations, this article will document that EPA's methods of selecting BAT and MACT standards contradict the common—but inaccurate—judicial assumptions.[9]

This article will also demonstrate that the judiciary's misunderstandings stem ultimately from the ambiguous statutory provisions and legislative histories of the Clean Water Act and the Clean Air Act, which erroneously imply that technology-based standards are set without regard to the public health and environmental benefits that may flow from pollution control technologies. Some aspects of the Clean Water Act, for example, seem to indicate that EPA need not balance a control technology's benefits against its costs when the Agency selects BAT standards. Yet the overall structure of the Clean Water Act, together with certain congressional statements, makes it

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1427-31 (1991) (recounting the "huge quantities" of pollutants released by various industrial sectors since World War II and the adverse health effects of same). Assessing the toxicity of a pollutant involves both a qualitative inquiry about "the types of adverse health effects associated with exposure to a chemical" and a quantitative inquiry about the "magnitude of these adverse health effects resulting from specific exposures to the chemical." TOXIC AIR POLLUTION HANDBOOK 57 (David R. Patrick ed., 1994).

7. 33 U.S.C. § 1314(b)(2)(A)-(B) (2000) (also known as section 304(b)(2)(A)-(B) of the Clean Water Act). For ease, this article will refer to regulated "industries" when in actuality a wide variety of entities are governed by the technology-based standards under the Clean Water Act and the Clean Air Act, from traditional industries and manufacturers to various commercial enterprises, municipalities, hospitals, and educational facilities. *See, e.g.*, 40 C.F.R. §§ 411.10-411.37 (2004) (standards for cement manufacturers); *id.* §§ 405.10-405.127 (dairy products processors); *id.* §§ 435.10-435.70 (oil and gas extraction); *id.* §§ 460.10-460.12 (hospitals); *id.* §§ 63.1930-63.1980 (municipal solid waste landfills); *id.* § 63.7575 (boilers at "research centers, institutions of higher education, hotels, and laundries").

8. 42 U.S.C. § 7412(d)(2)-(3) (2000) (also known as section 112(d)(2)-(3) of the Clean Air Act). The Clean Water Act and the Clean Air Act are often analyzed together since they share many common features and were adopted at roughly the same time in the early 1970s, when Congress first adopted several different statutes addressing environmental issues. *See, e.g.*, Robert W. Adler, *Integrated Approaches to Water Pollution: Lessons from the Clean Air Act*, 23 HARV. ENVTL. L. REV. 203, 206-09 (1999) (analogizing between Clean Air Act and Clean Water Act for airshed and watershed approaches to regulation); Ann Powers, *Reducing Nitrogen Pollution on Long Island Sound: Is There a Place for Pollutant Trading?*, 23 COLUM. J. ENVTL. L. 137, 153-82 (1998) (comparing the two Acts' provisions with respect to pollutant trading).

9. *See infra* text accompanying notes 65-75 and 123-65.

clear that such a balancing is compelled by Congress' goals.[10] Likewise, certain elements of the Clean Air Act incorrectly suggest a fundamental dichotomy between technology-based standards, on the one hand, and "health-based" standards, on the other, with only the latter supposedly requiring an evaluation of the public health and environmental risks from the pollutants and facilities under review. The difference, however, between those two types of restrictions is not *whether* EPA considers those risks but *how* it does so. When setting a technology-based standard, the Agency is expected to—and does—use far simpler measures of the risks and corresponding public health benefits of regulation than if it were implementing a health-based standard.[11]

Because the judicial misconceptions that allow the Agency to thwart the APA arise from the confusing statutory schemes, legislative changes are needed to correct those misconceptions and to ensure the transparency of EPA's future rule makings. The Clean Water Act's BAT provision and the Clean Air Act's MACT provision should be amended to expressly require EPA, when setting standards, not only to weigh the costs of operating pollution control technologies (which the statutes already require) but also the benefits of improved public health and environmental quality offered by those technologies.[12] While these statutory amendments might be controversial because they reject the prevalent—though mistaken—notions of BAT and MACT standards, the changes are necessary to ensure that in all its rulemakings EPA reveals to the citizenry and judiciary the public health and environmental risks posed by the regulated industries and the corresponding benefits of pollution controls, which the Agency must logically consider and does, in fact, consider.

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10. *See infra* text accompanying notes 50-64.

11. *See infra* text accompanying notes 167-85.

12. *See infra* text accompanying notes 195-208 (explaining how EPA could use simple methods of measuring those public health and environmental benefits). The observations and suggestions made here about these two specific programs would also apply to any future use of technology-based standards in other arenas. Professor Wagner, for instance, has written that such standards would be valuable under:

> the Clean Air Act [for regulating] the seven criteria pollutants emitted by many existing sources, the Toxic Substances Control Act for pre-market testing requirements, the Occupational Health and Safety Act for setting worker protection standards, the Comprehensive Environmental Response, Compensation and Liability Act for standardized cleanup requirements . . . specifying limitations on private party interference with endangered species and providing a more predictable and constructive approach to conserving wetlands.

Triumph, supra note 3, at 109-10.

II. THE CLEAN WATER ACT'S TECHNOLOGY-BASED STANDARDS

A. *Legislative History: Rejection of Health-Based Programs as the Primary Regulatory Tool*

The technology-based standards of the Clean Water Act originated in 1972 as a response to the failed implementation of an earlier health-based regulatory program that required states to adopt, with EPA oversight, "water quality standards"[13] for all interstate waters to "protect the public health or welfare [and] enhance the quality of water."[14] The water quality standards were intended to establish, *inter alia*, the maximum level of pollution that would be safe for individuals who drank from a waterway, fished in it, or boated on it,[15] but few

13. At that time, a water quality standard consisted of three elements: (1) a "designated use" for a particular water body (such as fishing, agriculture, or the like); (2) a "water quality criterion," which identifies the level of contamination that can be permitted in that water body while still supporting the designated use; and (3) a "plan of enforcement." WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW: AIR AND WATER 242-44 (2d ed. 1986) (describing water quality criteria and designated uses). *See also* Miss. Comm'n on Natural Res. v. Costle, 625 F.2d 1269, 1272 (5th Cir. 1980) (giving examples of "[p]ossible uses" of waterways "for industry, agriculture, propagation and protection of fish and wildlife, recreation, and public water supply"). Congress subsequently dropped the requirement for an enforcement plan as part of the standard itself, so today water quality standards include just two elements: the designated uses of waterways and the water quality criteria. *See* 33 U.S.C. § 1313(c)(2)(A) (2000); Rodgers, *supra*, at 242-43. In a separate provision, the legislature established a key mechanism—total maximum daily loads ("TMDLs")—for implementing the water quality standards. 33 U.S.C. § 1313(d)(1)(C).

14. That statutory mandate stemmed from the Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903 (1965) (codified at 33 U.S.C. § 466g(c)(3) (1964 ed., Supp. V), *amended by* Pub. L. No. 92-500, § 2, 86 Stat. 816 (1972)). For Congress' rejection of that approach beginning in 1972, see FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972: SENATE PUBLIC WORKS COMMITTEE REPORT TO ACCOMPANY S. 2770, S. REP. NO. 92-414, at 4 (1971), *as reprinted in* 1972 U.S.C.C.A.N. 3668, 3671 (explaining how earlier program required states to "establish the maximum level of pollution allowable in interstate waters" and discussing difficulties of that earlier program). The history of, and difficulties with, the states' efforts to implement the water quality standards have been written about extensively, so only a brief summary will be given here. *See, e.g.*, Weyerhaeuser v. Costle, 590 F.2d 1011, 1042 n.45 (D.C. Cir. 1978) (describing history and citing various earlier law review articles regarding same); William L. Andreen, *The Evolution of Water Pollution Control in the United States—State, Local, and Federal Efforts, 1789-1972: Part I*, 22 STAN. ENVTL. L.J. 145, 189-200 (2003) [hereinafter *Andreen Part I*] (discussing reasons for frustrations with state efforts); William L. Andreen, *The Evolution of Water Pollution Control in the United States—State, Local, and Federal Efforts, 1789-1972: Part II*, 22 STAN. ENVTL. L.J. 215, 260-86 (2003) [hereinafter *Andreen Part II*] (discussing federal response, in 1972, to failures of state programs); Jeffrey M. Gaba, *Federal Supervision of State Water Quality Standards Under the Clean Water Act*, 36 VAND. L. REV. 1167, 1180-85 (1983) (discussing same); William F. Pedersen, Jr., *Turning the Tide on Water Quality*, 15 ECOLOGY L.Q. 69, 75-80 (1988) (discussing same).

15. *See* Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903 (1965) (codified at 33 U.S.C. § 466g(c)(3) (1964 ed., Supp. V)), *amended by* Pub. L. No. 92-500, § 2, 86 Stat. 816 (1972)

states adopted the standards because they lacked both the political will and the resources to do so.[16] Moreover, the pre-1972 law did not authorize the state or federal governments to set specific discharge limits on individual industrial plants, commercial establishments, or municipal wastewater plants to prevent the degradation of a water body.[17] Instead, regulators could only enforce the standards against an individual discharger after showing that it, in fact, was causing a violation of a water quality standard, which involved such a cumbersome process that very few enforcement actions were brought by the state or federal regulatory agencies.[18]

As a result, Congress began shifting the primary means of regulating water pollution from this health-based approach to technology-

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(requiring standards that, *inter alia*, "protect the public health or welfare" and "enhance the quality of water. . . tak[ing] into consideration [the water's] use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses."). *See also* PUD No. 1 of Jefferson County v. Wash. Dept. of Ecology, 511 U.S. 700, 719 (1994) (describing, under the modern Clean Water Act, protections for waters used for "drinking water, recreation, navigation or . . . as a fishery").

16. *See* S. REP. NO. 92-414, at 4 (1971), *as reprinted in* 1972 U.S.C.C.A.N. 3668, 3671 (explaining that many states did not have standards even after five years); *Andreen Part I*, *supra* note 14, at 194 (recounting weak enforcement efforts by states, in part, because of "limited political power"); Khristine L. Hall, *The Control of Toxic Pollutants Under the Federal Water Pollution Control Act Amendments of 1972*, 63 IOWA L. REV. 609, 611-12 (1978) ("Establishing an effective water quality standard was a cumbersome process, and many states resisted implementing effective standards.").

17. *See* P.D. Reed, *Industry Effluent Limitations Program in Disarray as Congress Prepares for Debate on Water Act Amendments*, 12 ENVTL. L. REP. 10,033, 10,033 n.2 (1982) (The pre-1972 law "did not specify how any agency was to translate water quality data into enforceable effluent standards for the diverse facilities discharging into polluted waterways."); *Andreen Part II*, *supra* note 14, at 254 n.249 (noting that pre-1972 law did not include "a statutory provision calling for the establishment of effluent limitations" on individual dischargers). Some states did, in fact, try to adopt permitting schemes to establish discharge limits for polluting facilities; other states declined to do so. *See* EPA v. California *ex rel.* State Water Res. Control Bd., 426 U.S. 200, 203 (1976); *Andreen Part I*, *supra* note 14, at 196.

18. The 1972 Senate Report noted "an almost total lack of enforcement" of the water quality standards. S. REP. NO. 92-414, at 5 (1971), *as reprinted in* 1972 U.S.C.C.A.N. 3668, 3672. It also referred to the "great difficulty associated with establishing reliable and enforceable precise effluent limitations on the basis of a given stream quality," and observed that the standards "often cannot be translated into effluent limitations—defendable in court tests [—] . . . because of the imprecision of models for water quality and the effects of effluents in most waters." *Id.* at 3675. *See also* Gaba, *supra* note 14, at 1179 (few enforcement actions were brought because the "1965 Act still required the government to locate a source of pollution and to prove that the particular source had caused the violation of a water quality standard"); *State Water Res. Control Bd.*, 426 U.S. at 202 (referring to "cumbrous enforcement procedures" under the pre-1972 law); *Weyerhaeuser*, 590 F.2d at 1044 n.50 (describing legislators' frustration with $2 million spent on trying to prove that the discharge of one particular industry would adversely affect the quality of its receiving water and the oysters in that water).

based programs.[19] The 1972 Amendments to the Clean Water Act[20] directed EPA to set technology-based limits for pollutant discharges from existing industrial "point sources."[21] Those standards, which generally would apply uniformly to all members of an industry across the nation,[22] depended on the Agency's study of the industry to determine which pollutants it released and which control options, if any, were available to reduce or eliminate those pollutants.[23] The stan-

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19. *See* Reed, *supra* note 17, at 10,033 (In 1972, Congress "scrap[ped] an ineffective regulatory system based on water quality in favor of a more workable technology-based system of effluent regulation."); Oliver A. Houck, *Of Bats, Birds and B-A-T: The Convergent Evolution of Environmental Law*, 63 MISS. L.J. 403, 418 (1994) ("[B]est available technology side-stepped the age-old and irresolvable arguments of whether 'significant' harm existed and who was 'causing' it and began to abate the pollution itself."); *State Water Res. Control Bd.*, 426 U.S. at 204-05 (After the 1972 statutory amendments, a "discharger's performance [was] . . . measured against strict technology-based effluent limitations—specif[ing] levels of treatment—to which it must conform, rather than against limitations derived from water quality standards to which it and other polluters must collectively conform.").

20. Officially the 1972 amendments were called the Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1387 (2000)).

21. 33 U.S.C. §§ 1311(b), 1314(b). *See* E.I. du Pont de Nemours & Co. v. Train, 430 U.S. 112, 128 (1977) (interpreting 1972 amendments to authorize EPA to adopt binding, industry-wide technology-based regulations).

"Point sources" are pipes, channels, or other discrete, identifiable means to convey pollutants into receiving water bodies. 33 U.S.C. § 1362(14). Any point source discharging a pollutant into waters of the United States is required to obtain a permit under the National Pollutant Discharge Elimination System ("NPDES"), which requires compliance, at a minimum, with the technology-based standards set by EPA. *Id.* § 1342. *See* Hall, *supra* note 16, at 612.

Since 1972, EPA has also been required to set technology-based standards for brand new industrial sources, known as "New Source Performance Standards." *See* 33 U.S.C. § 1316. Sources of municipal wastewater, as opposed to industrial dischargers, are regulated under a separate program. *Id.* § 1311(b)(1)(B) (requiring publicly owned treatment works to use "secondary treatment" by 1977); *id.* § 1311(b)(2)(B) (1970 ed., Supp. III) (requiring, by 1983, the use of the best practicable waste treatment technology), *repealed by* Pub. L. No. 97-117, § 21(b), 95 Stat. 1623, 1632 (1981)).

22. *See* Hall, *supra* note 16, at 612 (describing the "nationally uniform" standards). Under limited circumstances, an individual member of a regulated industrial category can be excused from a technology-based standard under a "variance." *See* William Funk, *The Exception that Approves the Rule: FDF Variances Under the Clean Water Act*, 13 B.C. ENVTL. AFF. L. REV. 1, 1-47 (1985) (analyzing three United States Supreme Court decisions that addressed the scope of variances under the Clean Water Act).

23. *See* D. Bruce La Pierre, *Technology-Forcing and Federal Environmental Protection Statutes*, 62 IOWA L. REV. 771, 810-11 (1977). EPA's task of identifying the pollution control technologies that are "available" to an industry actually leaves the Agency with considerable discretion because it must determine, for instance, whether a control method used only on an experimental, pilot project is "available" for the industry as a whole. *Compare* Tanners' Council, Inc. v. Train, 540 F.2d 1188, 1195 (4th Cir. 1976) (EPA may sets standards based on "technologies that have not been applied" yet) *with* Am. Petroleum Inst. v. EPA, 540 F.2d 1023, 1038 (10th Cir. 1976) (EPA's reliance on data from one pilot plant not sufficient basis for standards).

dards were to apply in two stages: By 1977 all existing industrial sources of "non-toxic" pollutants[24] would have to meet discharge limits reflecting the "best practicable control technology currently available," called "BPT" standards,[25] and by 1983 all such sources would have to meet more stringent limits based on the "best available technology economically achievable," called "BAT" standards.[26] Further modifications were enacted in 1977 when the legislature divided the non-toxic pollutants into two subsets and established for the so called

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Moreover, the Agency must decide whether a well-established but extraordinarily expensive technology is "available." As Professors Ackerman and Stewart wrote:

> "Available technology" is an elastic concept. In many instances, including most cases of water pollution, technology is available in an engineering sense to eliminate pollution entirely. If we were willing to spend hundreds of billions of dollars, we could have drinking water flowing from industrial waste discharge pipes (although disposing of the pollutants removed from waste streams could present serious problems). Accordingly, most decisions about "available" technology must—implicitly or explicitly—take costs into account.

Bruce A. Ackerman & Richard B. Stewart, *Reforming Environment Law*, 37 STAN. L. REV. 1333, 1359 n.60 (1985).

24. Examples of so called non-toxic pollutants (a poor choice of words for substances that can cause adverse health and environmental effects) include suspended solids, oil, grease, fecal coliform, ammonia, formaldehyde, and phosphorous. *See, e.g.*, Effluent Limitations Guidelines and New Source Perfomance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872, 57,874 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451) (listing pollutants in the "conventional" and "non-conventional" subcategories of "non-toxic" pollutants).

25. *See* 33 U.S.C. § 1311(b)(1)(A). While early case law used the more technically correct acronym of "BPCTCA" (*see, e.g.*, Weyerhaeuser v. Costle, 590 F.2d 1011, 1016 (D.C. Cir. 1978), this article will use the more common "BPT" acronym.

26. 33 U.S.C. § 1311(b)(2)(A). *See du Pont*, 430 U.S. at 121 (setting forth the 1977 and 1983 deadlines for the respective technology-based standards). While early case law used the more technically correct acronym of "BATEA" (*see, e.g.*, *Weyerhaeuser*, 590 F.2d at 1016), this article will use the more common "BAT" acronym.

Congress retained water quality standards as a supplement to the technology-based program. *See* Miss. Comm'n on Natural Res. v. Costle, 625 F.2d 1269, 1272 (5th Cir. 1980) (describing legislative history in 1972 with regard to water quality standards). States were required to continue designating uses for water bodies and to adopt water quality criteria to meet those uses, with EPA oversight. *Id.* If an industrial discharger meeting technology-based standards contributed to the degradation of a particular waterway, its permit limits would have to be ratcheted down to help meet the water quality standards. *See* EPA v. California *ex rel.* State Water Res. Control Bd., 426 U.S. 200, 205 n.12 (1976).

This article will refer to a pollution control "technology" to mean not only a post-production, add-on device that removes pollutants from an air stack or water outfall pipe, but also to work practices that minimize the creation of pollutants before they ever reach the stack or pipe. This article will also refer to the "best" technology in quotations because there is no single, absolute "best" method for any given industry; instead, as discussed below, what EPA calls the "best" technology is a policy judgment about which reasonable persons could disagree. *See infra* text accompanying notes 65-76.

"conventional, non-toxic" pollutants[27] the new "BCT" standards, referring to the "best conventional" technology,[28] while for the "non-conventional but non-toxic" pollutants[29] the compliance deadlines for the BAT standards were extended.[30]

For "toxic pollutants," which include carcinogens,[31] Congress was unwilling in 1972 to abandon the health-based regulatory program, but it did put the onus on EPA rather than the states to implement the scheme.[32] The legislature mandated that the Agency set standards that would provide an "ample margin of safety" to protect public health,[33] which, like water quality standards, required the regulators to try to make a detailed inquiry into the risks posed by a pollutant in a water body to declare a "safe" level.[34] That inquiry proved far too complex to be implemented in a timely fashion,[35] and after five years

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27. *See* Robert W. Adler, *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical and Biological Integrity*, 33 ENVTL. L. 29, 48 n.100 (2003) ("Conventional pollutants include biological oxygen demand, suspended solids, fecal coliform, and pH.").

28. 33 U.S.C. §§ 1311(b)(2)(E), 1314(b)(4). *See* Nat'l Wildlife Fed. v. Gorsuch, 693 F.2d 156, 181 (D.C. Cir. 1982) (The 1977 amendments "replac[ed] BAT altogether for 'conventional' non-toxic pollutants with the weaker requirement of 'best conventional pollutant control technology.'").

29. Non-conventional but non-toxic pollutants include ammonia, formaldehyde, and phosphorous. *See, e.g.*, Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872, 57,874 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451) (listing pollutants in that category).

30. Pub. L. No. 95-217, § 56, 91 Stat. 1566 (1977) (amended 1987) (deadlines ranging from 1984 to 1987).

31. 33 U.S.C. § 1362(13) (defining pollutants as "toxic" if they will "cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions . . . or physical deformations . . .").

32. Hall, *supra* note 16, at 613 (explaining how Congress "singled out" toxic pollutant in 1972 for regulation by EPA under an "ample margin of safety" standard).

33. 33 U.S.C. § 1317(a)(4).

34. Reed, *supra* note 17, at 10,037 (standards for toxic water pollutants were to be based on "the toxicity, persistence, and degradability of the pollutants"); Howard Latin, *Ideal v. Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1308 (1985) (standards for toxic water pollutants required EPA "to identify safe exposure levels").

35. As Howard Latin writes:

> Thomas Jorling, the Assistant Administrator for Water and Hazardous Materials, testified before Congress that section 307(a) [33 U.S.C. § 1317(a)] was "technically impractical" because of the requirement "to demonstrate the cause and effect relationship between pollutants and public health." A 1977 legislative report on toxic pollutant regulation observed: "Without exception, witnesses testified to the overall lack of data for setting standards for either water quality or for individual chemicals, and to there being less data available than estimated at the time the FWPCA was enacted." Witnesses also agreed that reliable harm-based determinations were difficult to make and that the EPA possessed insufficient resources to identify safe exposure levels for most toxic substances.

EPA had only proposed "ample margin of safety" standards for nine toxic water pollutants, and had finalized none.[36] Consequently, with the 1977 Amendments to the Clean Water Act, Congress required EPA to establish technology-based BAT standards for existing sources of toxic pollutants as well.[37]

Hence, by that year, for both toxic and non-toxic water pollutants, Congress had abandoned its health-based regulatory system that had attempted, but failed, to calculate the precise risks to public health and the environment posed by industrial sources and to restrict discharges of water pollutants to "safe" levels. Instead, the legislature required each regulated source to meet technology-based discharge limits that reflected EPA's selection of the "best" pollution control technology available for that source, given the types of pollutants it released.

B. *The Necessary Weighing of Costs and Risk Reduction Benefits to Determine the "Best" Technology*

1. Background: The "Best Practicable Technology" Standards and the "Best Conventional Technology" Standards

EPA's implementation of the technology-based programs can best be understood by first examining the statutory provisions for the two, less stringent types of technology-based standards under the Clean Water Act: the "best practicable technology" standards and the "best conventional technology" standards. Both standards require the Agency to consider the costs of reducing pollutants and the "effluent reduction benefits."[38] To set BPT standards, for example, EPA must assess "the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application."[39] To set BCT standards, the Agency must consider "the rea-

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Latin, *supra* note 34, at 1308.

36. *Id.* at 1307.

37. 33 U.S.C. § 1311(b)(2)(C)-(b)(2)(D).

38. *Id.* § 1314 (b)(1)(B), (b)(4)(B).

39. *Id.* § 1314(b)(1)(B). EPA also must consider certain technical characteristics of the industry and the potential pollution control technology: "the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, [and] process changes." *Id.* It must also consider the "non-water quality environmental impact[s of using a control technology] (including [its] energy requirements)," because Congress wanted to ensure that a technology that reduced water pollutants did not turn around and create substantial solid wastes or air pollutants. *Id. See, e.g.*, 118 CONG. REC. 33,750 (1972) (reporting legislators' intent to have EPA consider non-water quality environmental impacts because "it would be foolhardy to credit one environmental account and debit

sonableness of the relationship between the costs of attaining a reduction in effluents and the effluent reduction benefits derived [therefrom]."[40]

Congress required EPA to take costs into account to avoid imposing undue burdens on the regulated entities and the nation's economy as a whole.[41] For some industries it is simply not technically possible to eliminate all pollutants without ceasing operations altogether.[42] For other industries, even if it is technically possible, the elimination of pollutants with add-on controls or changes in production methods may be very costly and lead to broader social costs.[43] For instance, products or services may become more expensive,[44] and firms operating on the margin may no longer be able to remain com-

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another by the same action"); *id.* at 33,763 (requiring EPA, in the context of a related provision, to consider energy requirements so as to make sure "the national interest in an adequate energy supply is expressly recognized").

40. 33 U.S.C. § 1314(b)(4)(B). Like the BPT provision, EPA must also consider certain technical issues regarding the regulated entities and the control technologies, as well as the non-water quality environmental impacts and energy requirements. *Id.* Unlike the BPT provision, the Agency must for the BCT standards also "compare the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources." *Id.*

41. *See, e.g.*, Rodgers, *supra* note 13, at 432-33 (describing BPT standards as "cost-sensitive" and BAT standards as set at the level that is "affordable by most of the industry"). *See also* Ackerman & Stewart, *supra* note 23, at 1335 (showing technology-based standards set at level that "will not cause a shutdown of the plant or industry").

"Cost-sensitive" standards such as BPT or BAT limits are far different than standards justified by formal, monetized cost-benefit analyses, where "every dollar spent on technology must return at least a dollar in enhanced water quality." Rodgers, *supra* note 13, at 432. Indeed, scholars have criticized technology-based standards precisely because they do not depend on a strict cost-benefit analysis, resulting in inefficient demands for pollutant reductions without any showing of environmental benefit. *See, e.g.*, Ackerman & Stewart, *supra* note 23, at 1335; Pedersen, *supra* note 14, at 76, 82-84.

42. *See* PAUL B. DOWNING, ENVIRONMENTAL ECONOMICS AND POLICY 27 (1984) (relating how an industry that produces a good or service that generates unwanted byproducts can only do one of three things to avoid releasing that byproduct: cease operations, change operations so as not to produce the byproduct, or install pollution control devices).

43. *See, e.g.*, James E. Krier, *On the Topology of Uniform Environmental Standards in a Federal System—and Why it Matters*, 54 MD. L. REV. 1226, 1232 (1995) ("The costs of pollution control, passed on to consumers, employers and employees, stockholders, and taxpayers are diverted from other worthy objectives. In a world of scarce resources (our world, like it or not) the cost of every benefit is the value of some alternative benefit one could have realized instead.").

44. *See, e.g.*, David M. Driesen, *The Societal Cost of Environmental Regulation: Beyond Administrative Cost-Benefit Analysis*, 24 ECOL. L.Q. 545, 568-70 (1997) (while not always true, sometimes consumer prices rise as environmental standards are imposed on an industry, as, for instance, when "consumers may have to pay higher prices" for electricity because of "pollution control requirements" on coal-fired utilities).

petitive, resulting in plant closures and job losses.[45] It is these types of economic disruptions that Congress expected the Agency to avoid when imposing a technology-based standard.[46]

By directing EPA to consider "effluent reduction benefits," rather than referring to a level of "safety," Congress intended to signal that the Agency need not use detailed risk information to pinpoint precisely how using a technology would protect the quality of a particular receiving water and the health of individuals who used that water, since efforts to do so had delayed implementation of the earlier health-based program.[47] Instead, to achieve prompt regulation, the legislature expected EPA to rely on simpler measures of the benefits gained by using a pollution control technology, such as, for example, merely counting the amount of pollutant that the technology could eliminate from a facility's effluent discharge.[48] It is important to recognize, however, that the underlying benefit of reducing pollutant discharges is, of course, a reduction in the risks that the pollutants pose to public health and the environment. Thus, even if EPA estimates the benefits of implementing control technologies by referring to nothing more than the quantities of pollutants they can reduce, the Agency is still regulating based on certain assumptions—either implicit or explicit—related to risk. It is assumed, for example,

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45. William Boyd, *Controlling Toxic Harms: The Struggle Over Dioxin Contamination in the Pulp and Paper Industry*, 21 STAN. ENVTL. L.J. 345, 385-86 (2002) (reporting EPA's estimates that compliance with limits on water and air discharges from the pulp and paper industry would "result in closure of eleven to thirteen mills, and lead to a loss of between 2,880 and 10,700 jobs").

46. *See* 118 CONG. REC. 33,749-50 (1972) (explaining that the "total cost of application technology . . . include[s] those internal, or plant, costs sustained by the owner or operator and those external costs such as potential unemployment, dislocation, and rural area economic development").

47. *See* Weyerhaeuser v. Costle, 590 F.2d 1011, 1044 n.49 (D.C. Cir. 1978) ("The phrase 'effluent reduction benefits' avoids any suggestion that receiving water quality is an issue."); *id.* at 1042 (for the technology-based standards, Congress rejected any attempt "to assess the benefits to particular bodies of receiving water," because trying to show that precise relationship had so slowed down the prior regulatory scheme). *See also* Sidney A. Shapiro & Thomas O. McGarity, *Not So Paradoxical: The Rationale for Technology-Based Regulation*, 1991 DUKE L.J. 729, 746-47 (describing how Congress rejected the "uncertainties and analytical quagmires concerning risk assessment [that] were bogging down" the earlier regulatory programs in favor of technology-based standards).

48. *See, e.g.*, *Weyerhaeuser*, 590 F.2d at 1044 n.49 (effluent reduction benefits "occur[] whenever less effluent is discharged"); Appalachian Power Co. v. EPA, 671 F.2d 801, 809 n.3 (4th Cir. 1982) (when Congress directs EPA to consider "effluent reduction benefits," it means "simply the benefits assumed to result . . . from any reduction in the level of effluents being discharged," not the precise health and environmental benefits that will result from the improved water quality).

that the pollutants being regulated are, in fact, harmful; that they are all equally toxic; and that reductions in the quantities discharged will correspond to reduced risks to public health and the environment.[49] Regardless, then, of the way that the Agency may choose to measure effluent reduction benefits, those benefits ultimately translate into "risk reduction benefits." This article will use that terminology to emphasize that public health and environmental risks remain the driving force—the *raison d'etre*—behind technology-based standards.

In sum, in the BPT and BCT provisions Congress expressly established two goals for EPA: first, to eliminate harmful water pollutants to the extent possible with available control technologies and second, to do so without imposing excessive burdens on the economy. To reflect those dual aims, Congress directed EPA to consider both the costs *and* the risk reduction benefits of candidate technologies when selecting the "best" technology for an industry to implement.

2. The Ambiguity of the "Best Available Technology" Provision

With an understanding of BPT and BCT standards, the more stringent—and more ambiguous—provision of the Clean Water Act requiring industries to use the "best available" technology can better be examined. Unlike the BPT and BCT provisions, the BAT provision does not expressly direct EPA to consider any "benefits" and simply requires the Agency to consider "the cost of achieving [an] effluent reduction."[50] Comparing the BAT provision with the BPT and BCT provisions, some courts have erroneously concluded that Congress intended EPA *not* to consider the benefits of pollution control technologies.[51] An internally contradictory legislative history seems to support that misinterpretation. Senator Edmund Muskie (D-Maine), one of the leaders in the enactment of the modern Clean Water Act, stated:

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49. *See Triumph*, *supra* note 3, at 92 (technology-based standards "assum[e] that there is pollution, that it is undesirable, and that a strong effort to reduce the pollution is needed").

50. 33 U.S.C. § 1314(b)(2)(B) (2000). Like the BPT and BCT provisions, it also directs EPA to take into account certain technical issues, such as the age of the equipment, as well as the non-water quality environmental impacts and energy requirements. *Id.*

51. *See, e.g.*, EPA v. Nat'l Crushed Stone Ass'n, 449 U.S. 64, 71 (1980) ("in assessing BAT total cost is [not] to be considered in comparison to effluent reduction benefits"); Rybachek v. EPA, 904 F.2d 1276, 1290-91 (9th Cir. 1990) (in setting BAT standards, EPA "need not compare such cost with the benefits of effluent reduction"); Reynolds Metals Co. v. EPA, 760 F.2d 549, 565 (4th Cir. 1985) (discussing same); Nat'l Ass'n of Metal Finishers v. EPA, 719 F.2d 624, 662 n.64 (3d Cir. 1983) (discussing same).

> In making the determination of "best available" [technology] for a category or class, the [EPA] Administrator is expected to apply the same principles involved in making the determination of [best practicable technology, the lesser standard] *except as to cost-benefit analysis*. . . . While cost should be a factor in the Administrator's judgment, *no balancing test will be required*. The Administrator will be bound by a *test of reasonableness*. In this case, the reasonableness of what is "economically achievable" should reflect an evaluation of what needs to be done to move toward the elimination of the discharge of pollutants and what is achievable through the application of available technology—*without regard to cost*.[52]

That statement suffers from various inconsistencies. One is whether costs should be evaluated at all when BAT standards are set. On the one hand, the Senator indicated that "cost should be a factor," but on the other, he emphasized regulation "without regard to cost" (which is contrary to the statutory language).[53] Another internal inconsistency, and one even more important to the discussion at hand, relates to whether EPA should compare costs and benefits. Senator Muskie said that no "cost-benefit analysis" should be done and "no balancing test will be required," which suggests, together with the absence in the BAT provision of any mention of "benefits," that EPA should not weigh a technology's benefits, only its costs.

Such a literal reading of the statute would make no sense. A determination of the "best available" technology based only on its costs would logically lead to the conclusion that *no* technology should be required because, without *any* benefits, the costs of any control technology would be unacceptable. Obviously, given the overarching purpose of the Clean Water Act, which is to "restore and maintain the chemical, physical, and biological integrity of the Nation's wa-

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52. 118 CONG. REC. 33,696 (1972) (statement of Sen. Muskie) (emphasis added). That quote comes from "exhibit 1" to Senator Muskie's remarks, which includes a "discussion," prepared by the Senator, "of each of the significant provisions of the bill" as reported by the Conference Committee). *See id.* at 33,693. Some courts mistakenly refer to Senator Muskie's statements as the Conference Report itself. *See, e.g.*, Ass'n of Pacific Fisheries v. EPA, 615 F.2d 794, 817 (9th Cir. 1980).

Senator Muskie's role as the manager of the conference bill in 1972 has been well recognized by the courts and, as a result, his comments have been given "significant weight." *See, e.g.*, Chesapeake Bay Found. v. Gwaltney of Smithfield, 791 F.2d 304, 311 n.13 (4th Cir. 1986), *vacated*, 484 U.S. 49 (1987).

53. Indeed, that confusion led to a split among the circuits as to whether costs should be considered when selecting BAT standards. *See Pacific Fisheries*, 615 F.2d at 817 (comparing Appalachian Power Co. v. Train, 545 F.2d 1351, 1361 (4th Cir. 1976), with Am. Iron & Steel Inst. v. EPA, 526 F.2d 1027, 1052 (3d Cir. 1975)).

ters,"[54] Congress expected dischargers, in fact, to use costly control technologies and to do so to protect the citizenry from harmful pollutants.[55] Hence, just as for the BPT and BCT programs, the legislature had not one goal but two for the BAT program: first, to be mindful of the costs of control, but second (and more importantly) to reduce the risks from discharges of toxic pollutants. Implicit, then, in the BAT statutory provision must be a requirement that EPA also consider the extent to which pollution control technologies can offer risk reduction benefits, not just the technologies' costs.[56]

Unfortunately, because Senator Muskie indicated that "the [EPA] Administrator will be bound by a test of *reasonableness*" when judging which costs are "economically achievable,"[57] some have interpreted this to mean that EPA must establish BAT standards by selecting the most stringent technology that would drive a "reasonable" number of marginal firms into bankruptcy, but not bankrupt an entire industry.[58] That view, however, simply shifts the necessary considera-

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54. 33 U.S.C. § 1251(a). *See* Robert W. Adler, *The Two Lost Books in the Water Quality Trilogy: The Elusive Objectives of Physical and Biological Integrity*, 33 ENVTL. L. 29, 29-31 (2003) (discussing congressional intent to establish Clean Water Act goals of not only protecting the chemical integrity of the nation's waters, but also their physical and biological integrity).

55. *See* Daniel C. Esty, *What's the Risk with Risk?*, 13 YALE J. ON REG. 603, 603 (1996) (book review) ("Reducing risk is, almost by definition, the central purpose of environmental regulation.").

56. *See, e.g.*, Ackerman & Stewart, *supra* note 23, at 1341 ("A BAT system has an implicit environmental goal. . . ."). In other words, even if one argued that Senator Muskie should be understood to mean that the "best" technology would be the cheapest one that had *any* ability to reduce pollutants, EPA would still have to make sure that a candidate technology at least had that very minimal impact, which is nothing more than a consideration of its benefits. Moreover, that interpretation would elevate concern about the expense of the control method above concern for its environmental impacts—hardly Congress' intent.

Thus, even though no mention is made of benefits in the statute, the provision should not be read literally using the maxim of *exclusio unius est inclusio alterius*. Courts are often willing to reject nonsensical, literal readings of narrow statutory provisions in favor of more logical interpretations based on the overall purposes of statute. *See, e.g.*, U.S. Nat'l Bank of Or. v. Indep. Ins. Agents of Am., Inc., 508 U.S. 439, 455 (1993) ("Over and over we have stressed that '[i]n expounding a statute, we must not be guided by a single sentence or member of a sentence, but look to the provisions of the whole law, and to its object and policy.'"); Sullivan v. Hudson, 490 U.S. 877, 890 (1989) (rejecting *exclusio unius* argument in favor of "the most reasonable interpretation of the statute in light of its manifest purpose"). *See also* Karl N. Llewellyn, *Remarks on the Theory of Appellate Decision and the Rules or Canons About How Statutes are to be Construed*, 3 VAND. L. REV. 395, 403 (1950) (noting that for every canon such as *exclusio unius*, an opposite canon of statutory construction can be found).

57. 118 CONG. REC. 33,696 (1972) (emphasis added).

58. *See, e.g.*, Am. Iron & Steel Inst. v. EPA, 526 F.2d 1027, 1051-52 (3d Cir. 1975) (quoting Senator Muskie's statement and statement of another Senator to find that EPA has discretion to determine what level of "economic disruption" should be acceptable under a BAT standard, since "Congress clearly contemplated that cleaning up the nation's waters might necessitate the

tion of risk reduction benefits to the determination of what a "reasonable" number of bankruptcies would be. Certainly Congress could not have intended to allow bankruptcies for their own sake, with no related benefits, but instead was willing to impose the costs of using pollution control technologies, including the loss of marginal firms, to improve public health and the environment by eliminating harmful pollutants. Thus, Senator Muskie's test of "reasonable" costs must be understood to mean "reasonable" *in relation to the benefits derived.* The more risk reduction benefits achieved by adopting a certain control technology, the greater might be the "reasonable" number of firms bankrupted by a BAT standard that relies on that technology.

Indeed, some courts have confirmed that, under the BAT provision, the costs of using a technology must be reasonable compared to its benefits. For instance, the United States Court of Appeals for the Fifth Circuit in *American Petroleum Institute v. EPA* agreed with the industry challengers that extremely costly technologies should not be imposed on the industry for only *de minimis* pollutant reductions.[59] According to the court, "EPA would disserve its mandate were it to tilt at windmills by imposing BAT limitations which removed *de minimis* amounts of polluting agents from our nation's waters, while imposing possibly disabling costs upon the regulated industry."[60] Likewise, the United States Court of Appeals for the Ninth Circuit in *Association of Pacific Fisheries v. EPA* observed that "[a]t some point extremely costly[,] more refined treatment will have a *de minimis* effect on the receiving waters,"[61] suggesting that at that point the Agency could properly declare the extremely costly treatment, even

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closing of some marginal plants"). *See also* ENVIRONMENTALLY INDUCED CANCER, *supra* note 2, at 90-91 (describing "feasibility analysis" as demanding the most stringent, technically feasible controls that will not "close down an entire industry"); David M. Driesen, *Distributing the Costs of Environmental, Health, and Safety Protection: The Feasibility Principle, Cost-Benefit Analysis, and Regulatory Reform*, 32 B.C. ENVTL. AFF. L. REV. 1, 2 (2005) ("The feasibility principle reflects a . . . preference for avoiding widespread plant shutdowns.").

59. 787 F.2d 965, 972 (5th Cir. 1986).

60. *Id.*

61. 615 F.2d 794, 818 (9th Cir. 1980). The court also noted that EPA had "concluded that the benefits justified the costs" of the BAT standards. The opinion is confusing, however, because the Ninth Circuit also concluded, because of the "conspicuous absence" of "benefits" in the BAT statutory provision, that "Congress did not intend the Agency . . . to engage in marginal cost-benefit analysis." *Id.* at 818. If read broadly, that statement would suggest no weighing of both costs and benefits is required. The better interpretation, however, given the court's mention of "marginal" costs and benefits, is to understand that EPA need not find a close fit between the incremental benefits of using a technology more stringent than the BPT technology and its incremental costs, as the petitioners wanted. *Id.*

though technically achievable, not to be the "best available" technology, given the unreasonableness of the costs in relation to the public health and environmental benefits.[62]

If, even for BAT standards, the costs are to be reasonable in light of the benefits, then what interpretation should be given to Senator Muskie's ambiguous statements that no "cost-benefit analysis" was to be undertaken for a BAT standard and that no "balancing test will be required?" As observed by some jurists, the Senator likely was trying to signal that for BAT standards—which, again, were intended to be the most stringent—EPA does not have to find as close a fit between the costs and benefits of a control technology as it would for a BPT standard.[63] Instead, even a technology whose expense might not justify declaring it the "best practicable" could be declared the "best available."[64]

Thus, even though the risk reduction benefits of using a control technology are not mentioned as a factor in the Clean Water Act's

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62. *Id.* *See also* Appalachian Power Co. v. Train, 545 F.2d 1351, 1361 (4th Cir. 1976) (rejecting claim that "the benefits derived from a particular level of effluent reduction must be quantified in monetary terms," but requiring EPA to consider non-monetized benefits to determine whether a BAT standard would make "reasonable further progress" toward elimination of harmful discharges, as required by 33 U.S.C. § 1311(b)(2)(A) (2000)); American Petroleum Inst. v. EPA, 858 F.2d 261, 265 (5th Cir. 1988) (implying that a BAT standard must at least provide "minimal environmental impact" that is "technologically and economically achievable").

63. Am. Iron & Steel Inst. v. EPA, 526 F.2d 1027, 1075 n.15 (3d Cir. 1975) (concurrence by Adams, J.) (noting that even though the BAT provision does not specifically direct EPA to consider costs in relation to benefits, it directs EPA to consider the costs, which implies "some kind of comparison of costs and benefits, although the proportionality between costs and benefits, indicated by section 304(b)(1)(B) [for BPT], would not seem to be required [for BAT]"); Weyerhaeuser v. Costle, 590 F.2d 1011, 1045-46 (D.C. Cir. 1978) ("[A]ll factors, including costs and benefits are consideration[s]" for BAT standards, but the statute requires "more rigorous EPA consideration of cost versus benefit in the 1977 [BPT] standards than in the 1983 [BAT] standards."). *See also* Houck, *supra* note 19, at 462-63 & n.264 (noting *Weyerhaeuser* court's approval of EPA's use of "cost-benefit calculations" to set BAT standards).

64. *See* Rodgers, *supra* note 13, at 432 (BAT standards do not require the "balancing calculus" required for BPT standards). The real difference, then, between the BPT and BAT standards lies not in whether benefits are considered at all, but the level of economic disruption Congress was willing to accept for those benefits, with the greater costs being accepted for the more stringent BAT standards. Indeed, Professor Rodgers has described the hierarchy among the various technology-based standards under the Clean Water Act, as follows:

> As Congress slices, dices, and refines, we are presented with BPT as an initial standard for industry, BCT a smidgen tougher, [BAT] tougher yet, and the new source standards the toughest of all. Never mind that the first "best" is followed by three "better" yets.

Rodgers, *supra* note 13, at 420. In reality, as Professor Rodgers also notes, EPA has actually softened the lines between those categories by "often equat[ing] the BPT and [BAT] control obligations," so that a technology is declared to be both the "best practicable" and the "best available." *Id.*

BAT provision, and some statements in the legislative history might suggest that EPA is not to consider those benefits when setting a BAT standard, that illogical interpretation is not consistent with Congress' overall goals for the BAT program. The Agency must know a technology's risk reduction benefits—measured, if nothing else, by the amount of pollution it reduces—to determine whether it is the "best available."

3. EPA's Method of Setting BAT Standards: Weighing Costs and Risk Reduction Benefits (Including Pollutant Toxicities)

Consistent with Congress' expectation that EPA seek the maximum public health and environmental protection without imposing excessive burdens on the economy, risk reduction benefits (and obviously costs) have played a central role in EPA's implementation of the BAT program. In rulemakings spanning twenty-five years, the Agency has repeatedly selected as the "best available" those technologies whose costs were, in EPA's judgment, reasonable in light of the benefits of eliminating the harmful pollutants at issue.[65]

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65. As the Agency repeatedly stated in the early rulemakings for toxic pollutants, "in developing [a] proposed BAT [standard] . . . EPA has given substantial weight to the *reasonableness* of costs," with the Agency weighing "the volume and nature of the discharges, [and] . . . the general environmental effects of the pollutants" against "the costs and economic impacts of the required pollution control levels." *See, e.g.*, Inorganic Chemicals Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 45 Fed. Reg. 49,450, 49,454-55 (proposed July 24, 1980) (to be codified at 40 C.F.R. pt. 415) (emphasis added); Porcelain Enameling; Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 46 Fed. Reg. 8860, 8864 (proposed Jan. 27, 1981) (to be codified at 40 C.F.R. pt. 466); Electroplating and Metal Finishing Point Source Categories; Limitations, Guidelines and Standards, 48 Fed. Reg. 32,462, 32,467 (July 15, 1983) (to be codified at 40 C.F.R. pts. 413 & 433); Nonferrous Metals Forming and Iron and Steel/Copper/Aluminum Metal Powder Production and Powder Metallurgy Point Source Category Limitations, Guidelines and Standards, 49 Fed. Reg. 8112, 8123 (proposed Mar. 5, 1984) (to be codified at 40 C.F.R. pt. 471); Ore Mining and Dressing Point Source Category; Gold Placer Mining; Effluent Limitations Guidelines and New Source Performance Standards, 50 Fed. Reg. 47,982, 47,995 (Nov. 20, 1985) (to be codified at 40 C.F.R. pt. 440).

After 1985, although EPA did not expressly refer to seeking "reasonable" costs, it certainly continued that notion by seeking, for instance, to "mitigate [the] adverse economic impacts" on the industry under review without sacrificing "the toxic pound equivalents being removed under the proposed rule." Effluent Limitations Guidelines and Standards for the Metal Products and Machinery Point Source Category, 66 Fed. Reg. 424, 460 (proposed Jan. 3, 2001) (to be codified at 40 C.F.R. pts. 413, 433, 438, 463, 464, 467 & 471). Similarly, EPA sought "cost-effective" controls, based on a comparison of costs and risk reduction benefits. *See infra* text accompanying notes 71-74.

EPA could have evaluated the public health and environmental risks and the corresponding risk reduction benefits by considering only the amounts of pollutants candidate technologies could reduce, making the assumption that all pollutants were equally toxic.[66] Instead, EPA has measured those risk reduction benefits in a slightly more sophisticated manner, by considering both the quantity of pollutant a control technology could reduce and the pollutant's "nature"—namely, its relative toxicity compared to other pollutants—as established in prior water quality criteria proceedings.[67]

The costs and economic impacts of the pollution controls—against which EPA explicitly or implicitly compared the risk reduction benefits—were assessed by a number of different measures, including the capital expenses to install a pollution control technology and its annual operating costs; the increase in the consumer price of the goods or services provided by the plant; the number of plants or production lines anticipated to close if costs could not be passed on to consumers; and the number of workers that likely would become unemployed. *See, e.g.*, Inorganic Chemicals Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 45 Fed. Reg. at 49,461; Organic Chemicals and Plastics and Synthetic Fibers Category Effluent Limitations Guidelines and Standards, 52 Fed. Reg. 42,522, 42,539 (Nov. 5, 1987) (to be codified at 40 C.F.R. pts. 414 & 416); Pesticide Chemicals Manufacturing Category Effluent Limitations Guidelines and Standards, 57 Fed. Reg. 12,560, 12,572 (proposed Apr. 10, 1992) (to be codified at 40 C.F.R. pt. 455); Centralized Waste Treatment Category Effluent Limitations Guidelines and Standards, 60 Fed. Reg. 5464, 5494 (proposed Jan. 27, 1995) (to be codified 40 C.F.R. pt. 437); Meat and Poultry Products Point Source Category Effluent Limitations and Guidelines, 67 Fed. Reg. 8582, 8608-15 (proposed Feb. 25, 2002) (to be codified 40 C.F.R. pt. 432).

66. *See supra* text accompanying notes 48-49.

67. *See, e.g.*, Inorganic Chemicals Manufacturing Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 45 Fed. Reg. at 49,454 (considering the "volume and *nature*" of the pollutants at issue) (emphasis added); Porcelain Enameling; Point Source Category Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards, 46 Fed. Reg. at 8864 (discussing same); Electroplating and Metal Finishing Point Source Categories; Limitations, Guidelines and Standards, 48 Fed. Reg. at 32,467 (discussing same); Nonferrous Metals Forming and Iron and Steel/Copper/Aluminum Metal Powder Production and Powder Metallurgy Point Source Category Limitations, Guidelines and Standards, 49 Fed. Reg. at 8123 (discussing same); Ore Mining and Dressing Point Source Category; Gold Placer Mining; Effluent Limitations Guidelines and New Source Performance Standards, 50 Fed. Reg. at 47,995 (discussing same).

As noted earlier, water quality criteria indicate the amount of a pollutant that could be allowed in a waterway without disrupting the use of the water for drinking, fishing, or other purposes. *See supra* text accompanying notes 13-15. EPA explains that water quality criteria are based on "data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects." National Recommended Water Quality Criteria, 63 Fed. Reg. 68,354, 68,354 (Dec. 10, 1998) (collecting the latest water quality criteria and describing process for setting same). *See also* NRDC v. EPA, 806 F. Supp. 1263, 1269 (E.D. Va. 1992) ("Numeric water criteria to protect human health [are] based on an assessment of the dose of [the pollutant] that may cause harm and the dose to humans that can be expected as a result of the [pollutant] present in the water.").

Based on the water quality criteria, EPA has created the concept of a "pound-equivalent," which refers to one pound of a substance with the toxicity of a particular reference pollutant—copper—against which other pollutants' toxicities are compared.[68] That notion allows EPA to calculate not simply the absolute amount of pollution that a control technology would reduce but an amount expressed in pounds-equivalent that reflected the nature of the pollutant.[69] For instance, a reduction of one pound of a pollutant less toxic than copper would actually be represented by only a fraction of a pound-equivalent, and a reduction of one pound of a more toxic pollutant would be represented by several pounds-equivalent.[70]

With information about the pounds-equivalent that candidate technologies could eliminate, the Agency has then calculated the "cost-effectiveness" of each control technology, which measures its cost to remove one pound-equivalent.[71] That calculation has served as an important factor in EPA's choices of the "best available" technologies. The Agency stated in 2002, for instance, that "in recently promulgated effluent guidelines, EPA has relied primarily on the toxic pollutant cost-effectiveness measure for evaluating BAT."[72] In

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68. *See, e.g.*, Nonferrous Metals Forming and Metal Powders Point Source Category; Copper Forming Point Source Category; Effluent Limitations and Guidelines, 50 Fed. Reg. 34,242, 34,255 (Aug. 23, 1985) (to be codified at 40 C.F.R. pts. 468 & 471) (describing the process of calculating pounds-equivalent, including the use of copper's water quality criterion as the weighting factor); Industrial Waste Combustor Subcategory of the Waste Combustors Point Source Category, Effluent Limitations and Guidelines, 63 Fed. Reg. 6392, 6411 (proposed Feb. 6, 1998) (to be codified at 40 C.F.R. pt. 444) (describing "toxicity normalized units called 'pound-equivalents'").

69. *See, e.g.*, Organic Chemicals and Plastics and Synthetic Fibers Category Effluent Limitations Guidelines and Standards, 52 Fed. Reg. at 42,552 ("A pound-equivalent is calculated by multiplying the number of pounds of a pollutant by the toxic weighting factor for that pollutant. The weighting factors give relatively more weight to more highly toxic pollutants."). *See, e.g.*, Iron and Steel Manufacturing Point Source Category Effluent Limitations Guideline and Standards, 67 Fed. Reg. 64,216, 64,249 (Oct. 17, 2002) (to be codified at 40 C.F.R. pt. 420) ("[t]he more toxic the pollutant, the higher will be the pollutant's toxic weighting factor").

70. *See, e.g.*, Oil and Gas Extraction Point Source Category Effluent Limitations Guidelines and Standards, 60 Fed. Reg. 9428, 9446 (proposed Feb. 17, 1995) (to be codified at 40 C.F.R. pt. 435) (representing 3.9 million absolute pounds of pollutants that would be reduced as only 1264 toxic pound-equivalents).

71. *See, e.g.*, Iron and Steel Manufacturing Point Source Category Effluent Limitations Guideline and Standards, 67 Fed. Reg. at 64,249 ("The analysis compares the total annualized cost incurred for a regulatory option to the corresponding effectiveness of that option in reducing the discharge of pollutants," that is, the estimated pounds-equivalent to be eliminated by this technology, so that the "cost-effectiveness value represents the unit cost of removing an additional pound-equivalent.").

72. Meat and Poultry Products Point Source Category Effluent Limitations Guidelines and Standards, 67 Fed. Reg. 8582, 8619 (proposed Feb. 25, 2002) (to be codified 40 C.F.R. pt. 432).

another rulemaking it wrote that while a cost-effectiveness analysis is "not required by the Clean Water Act," it is "a useful tool for evaluating regulatory options for the removal of toxic pollutants."[73] Indeed, some technologies have not been deemed the "best available" precisely because their costs per pound-equivalent were relatively high.[74]

This is not a new development. The Agency began analyzing the cost-effectiveness of the control options in the early 1980s. *See, e.g.*, Inorganic Chemicals Manufacturing Point Source Category Effluent Limitations Guidelines and Standards, 48 Fed. Reg. 49,408, 49,420 (proposed Oct. 25, 1983) (to be codified at 40 C.F.R. 415); Pesticide Chemicals Manufacturing Category Effluent Limitations Guidelines and Standards, 57 Fed. Reg. 12,560, 12,572 (proposed Apr. 10, 1992) (to be codified at 40 C.F.R. pt. 455) (in setting BAT limits, "the Agency takes into consideration factors such as plant closures, product line closures, and *total cost-effectiveness* (*dollar per pound-equivalent removal*)") (emphasis added). *See also* Reynolds Metals Co. v. EPA, 760 F.2d 549, 565-66 (4th Cir. 1985) (explaining EPA's use in a 1983 BAT rulemaking of pound-equivalents, standardized to the toxicity of copper, to determine the "cost-effectiveness" of various control options).

EPA goes so far as to convert the costs into 1981 dollars "so that comparisons of the cost-effectiveness among regulated industries can be made." *See, e.g.*, Oil and Gas Extraction Point Source Category Offshore Subcategory Effluent Limitations Guidelines and Standards, 58 Fed. Reg. 12,454, 12,492 (Mar. 4, 1993) (to be codified at 40 C.F.R. pt. 435); Oil and Gas Extraction Point Source Category, Coastal Subcategory Effluent Limitations Guidelines and Standards, 60 Fed. Reg. 9428, 9466 (proposed Feb. 17, 1995) (to be codified at 40 C.F.R. pt. 435) (similar); Pulp, Paper, and Paperboard Category Effluent Limitations Guidelines and Standards, 63 Fed. Reg. 18,504, 18,583 (Apr. 15, 1998) (to be codified at 40 C.F.R. pts. 3, 261 & 430) (similar).

73. Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards for the Iron and Steel Manufacturing Point Source Category, 67 Fed. Reg. 64,216, 64,249 (Oct. 17, 2002) (to be codified at 40 C.F.R. pt. 420). *See also* Effluent Limitations Guidelines and Pretreatment Standards for the Industrial Laundries Point Source Category, 64 Fed. Reg. 45,072, 45,077 (proposed Aug. 18, 1999) (to be codified at 40 C.F.R. pt. 441) (emphasizing that it was not required by the Clean Water Act to consider cost-effectiveness when setting a BAT standard, but the analysis was helpful "to determine which option along a spectrum of options is most efficient").

74. *See, e.g.*, Effluent Limitations Guidelines and New Source Performance Standards for the Metal Products and Machinery Point Source Category, 68 Fed. Reg. 25,686, 25,705 (May 13, 2003) (to be codified at 40 C.F.R. pt. 438) (rejecting a technology as the basis for a BAT standard, even though it would not cause excessive number of bankruptcies, because its costs "are disproportionate to the estimated toxic pollutant reductions. EPA estimates compliance costs of $0.3 million (2001 [dollars]) with only 186 toxic pound-equivalents (PE) being removed. This equates to a cost-effectiveness value (in 1981 [dollars]) of approximately $900/PE."); *id.* at 25,707 (similar reasoning for a different subcategory of the industry). *See also* Textile Mills Point Source Category Effluent Limitations Guidelines, Pretreatment Standards and New Source Performance Standards, 47 Fed. Reg. 38,810, 38,814 (Sept. 2, 1982) (to be codified at 40 C.F.R. pt. 410) (rejecting a technology as the basis for a BAT standard after analyzing, *inter alia*, "the cost per pound of pollutant removed by the proposed BAT standard," and finding that cost "significantly higher than that of other industries for which BAT limitations have been established," and ultimately concluding that the "costs of additional removal of [pollutants] and the economic impact do not justify further control").

Setting a BAT standard, then, should not be seen as merely a technocratic inquiry about which pollution control methods are available to an industry, but a value-laden political judgment to be made by EPA policymakers.[75] The Agency must decide whether to reject a technology that can be implemented as a matter of engineering because, in EPA's view, the costs are unreasonable compared to the risk reduction benefits available from that technology, as reflected by the quantity and toxic nature of the pollutant it would reduce.[76] Where exactly to draw the line between reasonable and unreasonable costs—and hence the line between the "best available" technology and other technologies—depends strictly on the Agency's policy preferences.

C. *The Failure of Courts to Give APA Review to the Agency's Calculations of Risk Reduction Benefits Under the BAT Program*

The Administrative Procedure Act is designed to ensure the accountability of unelected agency officials by requiring all rulemakings to be transparent to the citizenry, the President, Congress, and reviewing courts, thus facilitating the political and judicial oversight necessary to prevent an agency from violating the mandates of its governing statute or from abusing the discretion left to it by the legis-

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75. *See, e.g.*, John S. Applegate, *Worst Things First: Risk, Information, and Regulatory Structure in Toxic Substances Control*, 9 YALE J. ON REG. 277, 315-16 (1992) (The selection of technology-based standards is "merely a surrogate, and not necessarily an accurate one, for the underlying tradeoff of health versus cost."); Adam Babich, *Too Much Science in Environmental Law*, 28 COLUM. J. ENVTL. L. 119, 174 (2003) ("Setting technology-based standards, of course, requires coming to grips with the issue of economic feasibility, . . . [which] implies a value judgment about the point at which risk reduction becomes too expensive to make sense . . . ."); John D. Graham, *The Failure of Agency-Forcing: The Regulation of Airborne Carcinogens Under Section 112 of the Clean Air Act*, 1985 DUKE L.J. 100, 140 ("BAT is inevitably chosen with implicit cost-benefit considerations.").

One policymaker might believe that a technology should be rejected only if its costs are "extremely high" compared to "little" environmental benefit. Another policymaker might agree with that standard but not agree on what counts as "little" environmental benefit or an "extremely high" cost. Other decisionmakers, on the other hand, might believe that the costs should be "proportionate" to the benefits, but amongst themselves not agree on the precise meaning of "proportionate."

76. Looking to only limited information about the quantity and nature of the pollutant that a control technology could eliminate was consistent with Congress' intent for the BAT program. The legislature did not want it to bog down in all the many complex questions involved in trying to precisely determine, as under a health-based program, the distance the pollutant traveled from a facility under study, the number of persons living in the vicinity, how they might come into contact with the pollutant, and what likelihood of harm they would face. *See supra* text accompanying notes 47-49.

lature.[77] Three key aspects of the APA—as interpreted by hundreds of judicial decisions—are intended to foster agency transparency and accountability.[78] First, an agency must give public notice of its rule, explaining the rule's purposes and the factual and policy bases for it.[79] Second, the agency must receive and respond meaningfully to public

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77. As Professor McGarity has so aptly stated: "Transparency is a general desiderata for all regulatory decisionmaking because it helps ensure agency fidelity to statutory policies and thereby increases the confidence of affected citizens in the integrity of the decisionmaking process." Thomas O. McGarity, *Politics by Other Means: Law, Science, and Policy in EPA's Implementation of the Food Quality Protection Act*, 53 ADMIN. L. REV. 103, 203 (2001). The need for transparency extends even to those issues in environmental regulation that may ostensibly be "scientific" because they, no less than any other issues, always involve policy choices. *See* A. Dan Tarlock, *Who Owns Science?*, 10 PENN ST. ENVTL. L. REV. 135, 143 (2002) ("Science has no special claim to immunity from public scrutiny . . . ."). Transparency in environmental decisionmaking not only leads to democratically legitimate decisions by "incorporating public values into [those] decisions," but also "increas[es] the substantive quality of [those] decisions," and "resolv[es] conflict among competing interests." *See* Thomas C. Beierle & Jerry Cayford, *Environmental Decision Making: What Does Public Participation Add?*, 28 ADMIN. & REG. L. NEWS 6 (2003). *But see* Samuel R. Bagenstos, *The ADA as Risk Regulation*, 101 COLUM. L. REV. 1479, 1484-87 (2001) (laying out arguments that, in fact, the public has "irrational" perceptions of risks and, thus, risk regulation should be left to the "expert" agencies without much public input).

The APA governs EPA's actions under the Clean Water Act. *See, e.g.*, NRDC v. EPA, 822 F.2d 104, 121 (D.C. Cir. 1987) (citing earlier decisions). The Clean Air Act has its own rulemaking and judicial review provisions, modeled on the APA. *See* 42 U.S.C. § 7607(b), (d) (2000). This article will refer to the procedures and judicial review "under the APA" to mean both under the APA and under the analogous provisions of the Clean Air Act.

78. The APA has been described as a "procedural constitution" whose details have been filled in—and, some might say, created out of whole cloth—not by the legislature but by reviewing courts. *See, e.g.*, Sidney A. Shapiro, *A Delegation Theory of the APA*, 10 ADMIN. L.J. 89, 90 (1996) (citation and quotation marks omitted).

79. *See* 5 U.S.C. § 553(b) (2000) (requiring notice of proposed rule); *id.* § 553(c) (requiring notice of final rule to explain its "basis and purpose"). The requirement to provide a "concise general statement of basis and purpose" for a final rule "has blossomed into a requirement that agencies provide a 'reasoned explanation' for rules." Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 41 DUKE L.J. 1385, 1400 (1992) [hereinafter *Deossifying Rulemaking*]. *See also* Charles H. Koch, Jr., 1 *Administrative Law and Practice* § 4.45 (2d ed. 1997) ("basis and purpose" of rule is understood to mean the Agency's findings of fact and policy judgments). The Clean Air Act specifically requires rulemakings to include "a summary of the factual data on which the proposed rule is based [and] . . . and the major legal interpretations and policy considerations underlying the proposed rule." 42 U.S.C. § 7607(d)(3)(A) & (C).

Technically the APA requirements only apply to legislative rules, as opposed to procedural rules, interpretive rules, and policy statements. *Id.* § 553(b)(3)(A). Technology-based standards clearly constitute legislative rules subject to the publication requirements of the APA. *See* Robert A. Anthony, *Interpretive Rules, Policy Statements, Guidances, Manuals, and the Like—Should Federal Agencies Use Them to Bind the Public?*, 41 DUKE L.J. 1311, 1321-27 (1992) (explaining differences among legislative rules, interpretive rules, and policy statements).

comments on the proposed rule.[80] Third, an agency's regulation can be challenged in court,[81] where judges can invalidate the rule if, *inter alia*, the agency failed to follow required rulemaking procedures, exceeded its statutory authority, or made an arbitrary or capricious decision.[82]

Although EPA did, in fact, candidly explain in the preambles for its proposed BAT rules the risk reduction benefits offered by the control technologies under study, and also took and responded to public comments on the Agency's estimations of those benefits,[83] the courts—at EPA's urging and contrary to reason—have failed to give appropriate judicial scrutiny under the APA to those benefits calculations. In *American Iron & Steel Institute* ("*AISI*") *v. EPA*,[84] for instance, decided in the early years of the BAT program, the United States Court of Appeals for the Third Circuit noted that EPA had prepared "cost-benefit diagrams" for the BAT standards for the iron and steel manufacturing industry,[85] and had found, in the Agency's

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80. 5 U.S.C. § 553(c) (requiring agencies to "give interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments"); *Deossifying Rulemaking*, *supra* note 79, at 1400 (agencies "must rationally respond to outside comments passing a threshold requirement of materiality") (quote marks and citations omitted).

81. A petitioner must overcome several different hurdles to be heard. For instance, the agency action must not be entirely committed to the agency's discretion. *See* 5 U.S.C. § 701(a)(2). The petitioner must have standing. Lujan v. Defenders of Wildlife, 504 U.S. 555, 578 (1992). It must have exhausted all mandatory administrative remedies. Darby v. Cisneros, 509 U.S. 137, 147 (1993). The agency action must be final and ripe for review. Abbott Labs. v. Gardner, 387 U.S. 136, 148-49 (1967); 5 U.S.C. § 704. And the case must not be moot. Friends of the Earth v. Laidlaw, 528 U.S. 167, 189-90 (2000). In addition, the court can only hear issues that were first brought to the agency's attention during the public comment period. Etelson v. OPM, 684 F.2d 918, 923 (D.C. Cir. 1982).

82. *See* 5 U.S.C. § 706(2)(A), (C), (D). While this article assumes for the sake of argument that judicial review serves the valuable purpose of reigning in otherwise unchecked agencies, many scholars have long debated whether judicial review of agency action actually serves the public good either in theory or in practice. *See, e.g.*, Frank B. Cross, *Shattering the Fragile Case for Judicial Review of Rulemaking*, 85 VA. L. REV. 1243 (1999) (disputing theoretical justifications for such judicial review); Frank B. Cross, *Pragmatic Pathologies of Judicial Review of Administrative Rulemaking*, 78 N.C. L. REV. 1013 (2000) (documenting adverse, pragmatic consequences of judicial review of agency action); Ronald M. Levin, *Understanding Unreviewability in Administrative Law*, 74 MINN. L. REV. 689, 690 (1990) ("Today, some of the most respected commentators in the field offer pointed and often biting criticisms of the courts' place in the administrative process"); KENNETH CULP DAVIS & RICHARD J. PIERCE, JR., ADMINISTRATIVE LAW TREATISE 106 (3d. ed. 1994) (describing judicial review as a part of the "problem" of governance). Those important arguments are beyond the scope of this article and are reserved for another day.

83. *See supra* text accompanying notes 65-74.

84. 526 F.2d 1027 (3d Cir. 1975).

85. *Id.* at 1053.

words, that the "benefits of thus reducing the pollutants discharged justif[ied] the associated costs" of those standards.[86] The petitioners sought to challenge the Agency's calculations of the benefits as "inadequate and conclusory," but the court—based on the flawed presumption that those benefits calculations were not "required" to select a BAT standard—refused to address the petitioners' claim.[87] If the benefits calculations were not "required," the court reasoned, then EPA certainly was not compelled to perform them in any particular fashion, and hence, the court would not review the Agency's methodology.[88]

The *AISI* court not only failed to recognize the inherent need for EPA to consider risk reduction benefits when setting a BAT standard, but also ignored the fact that the Agency *had* considered them as a basis for these particular standards. To be fair, at the time of this early decision, jurists were just beginning to make sense of the very complex technology-based provisions of the Clean Water Act and the confusing legislative history, which seemed to support the court's conclusion.[89] No subsequent court, however, has ever reversed the *AISI* error by correctly ruling that EPA must consider a technology's risk reduction benefits and the courts must review those benefits considerations under the APA. In fact, the same faulty analysis of *AISI*

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86. *Id.* (quoting Iron and Steel Manufacturing Point Source Category, 39 Fed. Reg. 24,114, 24,118 (June 28, 1974) (to be codified at 40 C.F.R. pt. 420)).

87. *Id.* at 1052 n.54. That view matches the position of some scholars who distinguish technology-based standards from cost-benefit regulatory schemes, suggesting that for the former EPA simply determines which pollution control technology is "feasible," which does not depend on any weighing of the costs and benefits of using a technology. *See, e.g.*, *Environmental Strategies*, *supra* note 2, at 160 (distinguishing the "technology-based approach" from the "'balancing' approach that weights media-quality considerations against technological and economic considerations"); JOHN D. GRAHAM, LAURA C. GREEN & MARC J. ROBERTS, IN SEARCH OF SAFETY: CHEMICALS AND CANCER RISK 96-100, 105-08 (1988) (contrasting concepts of "lowest feasible risk" and "balancing of costs and benefits"); Driesen, *supra* note 58, at 3 (setting up a "comparison between CBA [cost-benefit analysis] and the feasibility principle"). To be sure, a formal, monetized comparison of costs and benefits is not required in selecting the "best" technology—whether "best practicable," "best available," or "best" anything else—but the question of whether a technology is "feasible" (or, similarly, "available") necessarily hinges, at least in some vague way, on whether its costs are worth its benefits. *Cf.* Ackerman & Stewart, *supra* note 23, 1359 n.60 (almost any technology would be "available" if we were willing to spend "hundreds of billions of dollars," but we are not so inclined).

88. *AISI*, 526 F.2d at 1052 n.54.

89. The *AISI* court, for instance, quoted Senator Muskie's ambiguous statements about the BAT program. 526 F.2d at 1051-52. *See supra* text accompanying notes 52-64 for a discussion of the confusion created by his remarks.

was repeated in a more recent Fifth Circuit case, suggesting the judiciary's continuing confusion about the BAT program.[90]

In *Texas Oil & Gas Ass'n v. EPA*,[91] which involved challenges to the BAT standards for coastal oil and gas producers, the Court of Appeals for the Fifth Circuit recognized that EPA had conducted a "10-Facility Study to estimate [the] pollution reduction benefits" of various options to minimize effluent dischargers from those sources.[92] The Agency had calculated the amount of pollution each control option would reduce annually and converted those quantities into "toxic pounds-equivalent."[93] EPA's analysis of the cost-effectiveness of each option—the cost to remove one pound-equivalent of toxic discharge—clearly served as part of the basis for its choice of the BAT standards.[94]

In court the industry petitioners sought to challenge EPA's calculations of the benefits, arguing that the 10-Facility Study had used information from sources that did not represent the industry as a whole.[95] The Agency claimed, however, that the benefits calculations served no role in EPA's selection of the BAT standards and were included in the rulemaking for an entirely different purpose.[96] The *Texas Oil* court—despite the evidence and logic to the contrary—

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90. Tex. Oil & Gas Ass'n v. EPA, 161 F.3d 923 (5th Cir. 1998).

91. *Id.*

92. *Id.* at 936.

93. *See, e.g.*, Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Oil and Gas Extraction Point Source Category, Coastal Subcategory, 60 Fed. Reg. 9428, 9446-47 (proposed Feb. 17, 1995) (to be codified at 40 C.F.R. pt. 435) (explaining that one control option "would result in the removal of approximately 3.9 million pounds of pollutants being discharged per year (*or 1264 pounds in toxic equivalents*)" and another option would remove "23 million pounds of pollutants. . . (*or 7375 toxic pounds equivalent*)") (emphasis added).

94. *See, e.g.*, *id.* (in the proposed rule, raising doubts about control options because of, *inter alia*, "the high cost-effectiveness results" for the controls and soliciting comment on same). In EPA's language "high cost-effectiveness" is not, as one might think, a good thing, as in "highly cost-effective;" rather, EPA means that the cost to remove one pound-equivalent was relatively high. *Id.* at 9447 ("The $3.9 million annually incurred by industry to remove the 3760 pounds of priority toxic pollutants indicates that this option is not cost-effective."). In the final rule, EPA also considered the ratio of costs to pounds-equivalent removed, though at that time, interestingly, it found the control options cost-effective. Final Effluent Limitations Guidelines and Standards for the Coastal Subcategory of the Oil and Gas Extraction Point Source Category, 61 Fed. Reg. 66,086, 66,110 (Dec. 16, 1996) (to be codified at 40 C.F.R. pt. 435).

95. *Tex. Oil*, 161 F.3d at 935-36.

96. EPA argued that it had calculated the benefits, not to help it choose the "best" technology, but because the statute requires the Agency to identify the "degree of effluent reduction attainable through the application of BAT." *Id.* at 936 (citing 33 U.S.C. § 1314(b)(2)(A) (2000)).

adopted EPA's position, and ruled, like the *AISI* court, that it would not hear any challenge to the benefits calculations because they were not "required" for the BAT determination and, thus, could not serve as a reason to overturn the BAT standards.[97]

The Fifth Circuit relied on two lines of cases to reach its erroneous conclusion. First, it cited *EPA v. National Crushed Stone Ass'n*,[98] in which the United States Supreme Court noted that Congress did not list "effluent reduction benefits" as a factor to be evaluated by EPA when it identifies the "best available" technology, but did specify that factor for the Agency to use when identifying the "best practicable" technology.[99] From this, the high court suggested in *dictum* that a technology's benefits do not play a role in the selection of BAT standards.[100] However, as noted earlier, such a literal reading of the statute is inappropriate since the "best" technology—whether it is the "best available" or the "best practicable" or "best" anything else—by definition cannot be identified without knowing the risk reduction benefits it offers.[101]

Second, *Texas Oil* cited *American Petroleum Institute* ("*API*") *v. EPA*,[102] which is one of several earlier cases that addressed a slightly different issue than the one before the *Texas Oil* court. In *API*, the industry challengers claimed that the Agency should have calculated precisely how a BAT standard would improve water quality, because they believed the discharge that EPA was seeking to regulate "pose[d] no environmental threat when discharged in . . . relatively small volumes."[103] The court disagreed, finding that the exact "impact of a particular discharge upon the receiving water is not an issue to be considered in setting technology-based limitations."[104] *API* and similar cases are consistent with the legislative history of the Clean Water

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97. *Id.*

98. 449 U.S. 64 (1980), *cited in Tex. Oil*, 161 F.3d at 936.

99. *Id.* at 70-71 (observing differences between sections 304(b)(1)(B) and 304(b)(2)(B) of the Clean Water Act).

100. *Id.* It was *dictum* because the case did not involve BAT standards and instead only dealt with the question of whether, for BPT standards, EPA had to provide a variance for certain facilities. *Id.* at 72. Nevertheless, that statement has been given considerable weight by lower courts. *See, e.g.*, Rybachek v. EPA, 904 F.2d 1276, 1290-91 (9th Cir. 1990); Nat'l Ass'n of Metal Finishers v. EPA, 719 F.2d 624, 662 n.64 (3d Cir. 1983).

101. *See supra* text accompanying notes 54-56.

102. 858 F.2d 261 (5th Cir. 1988), *cited in Tex. Oil*, 161 F.3d at 936.

103. *Id.* at 265.

104. *Id.* at 266. Other cases likewise have held that EPA "need not document specifically the benefits to society from the curtailment of pollutants from a particular point source." Cal. & Hawaiian Sugar Co. v. EPA, 553 F.2d 280, 289 (2d Cir. 1977).

Act's technology-based standards because Congress rejected earlier, prolonged efforts to assess exactly how a given pollution level would affect water quality or the health of the individuals that relied on that water.[105] That EPA need not determine the risk reduction benefits *precisely* says nothing, however, about whether the Agency must have even a *general* sense of those benefits, as indicated, for instance, by the quantity and nature of the pollutant that a control technology will reduce. Thus, the *Texas Oil* opinion's reliance on *API* was misplaced.

Decisions such as *AISI* and *Texas Oil* have plainly frustrated the goals of the APA by failing to review EPA's estimations of the risk reduction benefits, thereby leaving the Agency with unfettered discretion in the BAT standard setting process where—without the threat of judicial scrutiny—it can make arbitrary assessments of the control technologies' benefits. Moreover, *AISI* and *Texas Oil* create the opportunity for EPA, in future BAT rulemakings, to entirely withhold from the public its evaluations of those risk reduction benefits. After all, if judges mistakenly believe that a benefits calculation is not required for BAT standards, then the courts will not police EPA's behavior, requiring it to openly explain that factor in its *Federal Register* notices or take and respond to public comments on it.[106] Fortunately, it appears that EPA has continued to disclose its considerations of the risk reduction benefits offered by candidate technologies in its BAT rules under the Clean Water Act.[107] However, the potential for abuse under that program remains. In fact, as discussed in the next section, that very real potential has been realized in a similar program under the Clean Air Act, with EPA withholding from the citizenry and the judiciary key information about the risk reduction benefits of its technology-based standards.

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105. As one court said, EPA does not have to pinpoint the health and environmental benefits because "Congress, in its legislative wisdom, has determined that the many intangible benefits of dean water justify vesting the Administrator with broad discretion" to impose costly technologies on industries. FMC Corp. v. Train, 539 F.2d 973, 978-79 (4th Cir. 1976). *See also* Reed, *supra* note 17, at 10,035 (summarizing cases that "erased any doubt about whether water quality impact is relevant" to one particular context, the "BPT variance proceedings").

106. Indeed, these types of decisions might even create an incentive for EPA to do so because it might be hesitant to include its benefits calculations in a rulemaking when the language and legislative history of the Clean Water Act, as interpreted by the courts, not only suggest those benefits considerations are not *required* but might suggest they are not *permitted*.

107. *See, e.g.*, Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872, 57,912 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451) (presenting the Agency's "environmental benefits analysis").

III. THE CLEAN AIR ACT'S TECHNOLOGY-BASED STANDARDS

A. *Legislative History: A Similar Shift from Health-Based to Technology-Based Standards*

EPA failed miserably in its efforts to regulate hazardous air pollutants under the early health-based scheme of the Clean Air Act, which required the Agency not only to identify the pollutants that were likely to cause an increase in death or serious illness, but also to set emission limits for those pollutants at a level that would provide an "ample margin of safety" to protect public health.[108] In twenty years, the Agency only identified eight hazardous air pollutants and adopted "ample margin of safety" standards for a small fraction of the industries emitting those pollutants.[109] The delays were due in large part to EPA's difficulty in deciding, as a matter of public policy, which level of pollution should be deemed "safe."[110] They were also caused by the great deal of time and resources it took to calculate the exact risks from regulated sources, with the Agency relying on complex quantitative risk assessments that attempted to determine the dose-response curves for the pollutants, the distances and directions the pollutants traveled in the air, the population densities in the paths of the pollutants and the likely exposure routes.[111] As Senator Steven

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108. 42 U.S.C. § 1857c-7(b)(1)(A)-(B) (1970) (recodified in 1977) (current version at 42 U.S.C. § 7412(b)(1)(A)-(B) (2000)).

109. *See* S. REP. NO. 101-228, at 131 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3516 (describing EPA's delays).

110. *See* John P. Dwyer, *The Pathology of Symbolic Legislation*, 17 ECOLOGY L.Q. 233, 252-62 (1990); Sanford E. Gaines, *Science, Politics, and the Management of Toxic Risks Through Law*, 30 JURIMETRICS J. 271, 278-90 (1990) (analyzing the scientific, legal, and political uncertainties that hindered EPA's regulation of hazardous air pollutants); Patricia Ross McCubbin, *Amending the Clean Air Act to Establish Democratic Legitimacy for the Residual Risk Program*, 22 VA. ENVTL. L.J. 1, 8-10 (2003).

111. Graham, *supra* note 75, at 118-19 (noting EPA's reliance on lengthy, quantitative risk assessments). The National Research Council, an arm of the National Academy of Sciences, issued a seminal report in 1983 identifying "dose-response assessment" and "exposure assessment" as two of the key elements of a risk assessment. NATIONAL RESEARCH COUNCIL, RISK ASSESSMENT IN THE FEDERAL GOVERNMENT: MANAGING THE PROCESS 3 (1983). A dose-response assessment is typically determined by extrapolating from studies of laboratory animals exposed to the pollutant at doses far higher than usual human exposures. Mark Eliot Shere, *The Myth of Meaningful Environmental Risk Assessment*, 19 HARV. ENVTL. L. REV. 409, 432-40 (1995). An exposure assessment considers the dispersion of the pollutants under study and the numbers and characteristics of persons living in that trajectory. *Id.* at 441.

The science of risk assessment has been described (and criticized) extensively in other literature. *See, e.g.*, Donald T. Hornstein, *Reclaiming Environmental Law: A Normative Critique*

D. Symms (R-Idaho) explained, the Clean Air Act "has regulated air toxics [also called hazardous air pollutants] under the health-based standards . . . . But because the health risks from these kinds of pollutants are so vague and ill-defined, writing a standard that was soundly based in science has taken an extraordinary amount of time."[112]

Frustrated by EPA's slow pace, in 1990 Congress directed the Agency to establish technology-based standards—modeled on the Clean Water Act's provisions—as the main tool to regulate hazardous air pollutants.[113] The legislature anticipated that the technology-based program could be implemented more expeditiously than the prior health-based program, primarily because EPA would not need to rely on cumbersome quantitative risk assessments.[114] In addition, Congress itself identified the 189 hazardous air pollutants to be regulated, rather than requiring the Agency to spend the time and resources to identify them.[115] Finally, the legislature eased EPA's administrative burden by declaring a minimum standard that all

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of Comparative Risk Analysis, 92 COLUM. L. REV. 562 (1992); Robert R. Kuehn, *The Environmental Justice Implications of Quantitative Risk Assessment*, 1996 U. ILL. L. REV. 103; Howard Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89 (1988).

112. 136 CONG. REC. 3495 (1990) (statement of Rep. Symms). *See also* S. REP. NO. 101-228, at 171 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3556 (explaining that the legislators rejected "the kind of lengthy study and debate" involved in quantitative risk assessments because they have "crippled the current program").

113. Pub. L. No. 101-549 § 301, 104 Stat. 2399 (codified as amended at 42 U.S.C. § 7412(d) (2000)). *See* S. REP. NO. 101-228, at 155 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3540 (describing EPA's delays, observing that there is "now a broad consensus" to authorize EPA to use technology-based standards, and explaining analogy to the Clean Water Act). As a supplement to the new technology-based standards, Congress established the "Residual Risk" program, which would continue to require health-based "ample margin of safety" standards to address any emissions remaining after sources complied with the technology-based standards. 42 U.S.C. § 7412(f); McCubbin, *supra* note 110, at 34-35 (describing relationship between the technology-based standards and the "safety net" of the Residual Risk program). *See also infra* notes 168, 204 (discussing the Residual Risk program).

114. *See* 136 CONG. REC. 6465 (1990) (statement of Sen. Breaux) ("Rather than continuing to allow the current situation of endless debates over the health effects of exposure to particular pollutants before controls go into place, this legislation will ensure technology controls are applied to control these pollutants.").

115. *See* Pub. L. No. 101-549 § 301, 104 Stat. 2399 (codified as amended at 42 U.S.C. § 7412(b)) (listing 189 substances as hazardous air pollutants). In 1996, EPA, acting under authority of section 112(b)(3)(C), delisted one pollutant (caprolactam). *See* Hazardous Air Pollutant List; Modification, 61 Fed. Reg. 30,816 (June 18, 1996) (to be codified at 40 C.F.R. pt. 63). In 2004, EPA also delisted ethylene glycol monobutyl ether, bringing the total to 187. *See* List of Hazardous Air Pollutants, Petition Process, Lesser Quantity Designations, Source Category List; Petition To Delist of Ethylene Glycol Monobutyl Ether, 69 Fed. Reg. 69,320 (Nov. 29, 2004) (to be codified at 40 C.F.R. pt. 63).

facilities in the same industry would have to meet the so called "floor."[116] The floor for new "major" sources was set at the level of "emission control that is achieved in practice by the best controlled similar source,"[117] and for existing "major" sources the floor represented the "average emission limitation achieved by the best performing 12 percent" of sources in the same industrial category.[118] By mandating a floor, Congress eliminated any need for EPA to evaluate, at least at this stage of the regulatory process, the costs associated with any available pollution control technology or the risk reduction benefits offered by that technology. Nor would the Agency have to decide whether the costs were worth the benefits; the legislature had made that policy choice already.

Congress, however, did not eliminate all policy choices for the Agency. EPA still must decide if technology-based standards more stringent than the floors would be appropriate for regulated entities—standards that have come to be known as the "maximum achievable control technology" or "MACT" standards.[119] In particular, section 112(d)(2) of the Clean Air Act requires EPA to determine the "maximum degree of reduction in emissions" that can be achieved using any available technologies, "taking into consideration the cost of achieving such emission reduction."[120] With that statutory mandate Congress established similar goals for the MACT program and for the Clean Water Act's BAT program: to protect public health and the environment from the risks posed by hazardous air pollutants to the extent possible without imposing undue burdens on the nation's

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116. As the D.C. Circuit said in a related context, the "nomenclature can be confusing" because references to the floor actually "establish maximums on the emissions that EPA's standards may permit." Sierra Club v. EPA, 167 F.3d 658, 660 (D.C. Cir. 1999) (reviewing technology-based standard under section 129 of the Clean Air Act, which is very similar to section 112).

117. 42 U.S.C. § 7412(d)(3). A source is "major" if it "emits, or has the potential to emit . . . 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants." *Id.* § 7412(a)(1).

118. *Id.*

119. *See, e.g.*, Mossville Envtl. Action Now v. EPA, 370 F.3d 1232, 1235 (D.C. Cir. 2004) (describing "MACT standards"). Officially the MACT standards are listed in the *Federal Register* as National Emission Standards for Hazardous Air Pollutants ("NESHAPs"), which is also the pre-1990 terminology for the "ample margin of safety" standards. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction Plants, 68 Fed. Reg. 12,645 (proposed Mar. 17, 2003) (to be codified at 40 C.F.R. pt. 63).

120. 42 U.S.C. § 7412(d)(2). Congress also directed the Agency, as under the Clean Water Act, to consider two other factors that represent the "costs" of using a pollution control technology in the broader sense of the word: "the non-air quality health and environmental impacts" of the technology and its "energy requirements." *Id.*

economy.[121] Thus, although the MACT standards rely on the "maximum achievable" technology, whereas the BAT standards require the "best available" technology, in both cases the Agency's task is essentially the same: to seek those risk reduction benefits from a candidate technology that, in the Agency's policy judgment, justify the control costs.[122]

B. *EPA's Method of Setting MACT Standards: Limited Compliance with the APA*

1. Transparent Consideration of Pollutant Quantities and Toxicities as Indicators of Risk Reduction Benefits in Some MACT Rulemakings

Understanding the twin goals that Congress established for the MACT program, EPA correctly recognized early on that to choose whether to impose a standard more stringent than the floor it would have to consider not only the costs of a candidate technology, but also the risk reduction benefits it offered. As the Agency stated in its first major MACT rule: "As a matter of general policy in decisions to select control levels above the floor, EPA believes that the cost-effectiveness of controls and a comparison of *benefits*, both quantifiable and nonquantifiable, and costs are primary considerations."[123] Throughout the nearly 100 rulemakings in which EPA has adopted MACT standards for different industrial sectors, the Agency has repeatedly analyzed the risk reduction benefits of available technologies and rejected certain controls because the costs, compared to

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121. *See, e.g.*, S. REP. NO. 101-228, at 168 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3553 (in setting the MACT standards, EPA should select a control "configuration or calibration which provides the greatest protection to human health" and the "maximum protection of human health shall be the objective test" for EPA in selecting MACT standards); Clean Air Act Amendments of 1989, 136 CONG. REC. S3748, 1990 CAA Leg. Hist. 6946, 7197 (Lexis) (statement of Senator Domenici) ("[T]he basic concept of technology requirements is a necessary first step to assure the public that measures are being taken *to address this serious public health threat*.") (emphasis added).

122. EPA, in fact, refers to its regulatory actions under the MACT program as "serv[ing] the risk reduction purposes of the [Clean Air] Act." National Emission Standards for Hazardous Air Pollutants; Availability: Draft Schedule for the Promulgation of Emission Standards, 57 Fed. Reg. 44,147, 44,149 (proposed Sept. 24, 1992) (to be codified at 40 C.F.R. pt. 63).

123. National Emission Standards for Hazardous Air Pollutants for Source Categories; Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry and Seven Other Processes, 57 Fed. Reg. 62,608, 62,631 (proposed Dec. 31, 1992) (to be codified at 40 C.F.R. pt. 63)(emphasis added).

those benefits, were in its judgment "unreasonable,"[124] "excessive,"[125] or "disproportional."[126]

Periodically the Agency has explicitly characterized a control technology's risk reduction benefits in terms of both the quantity of pollutant that would be reduced and its relative toxicity. In one of its first regulations, for example, EPA expressly cited the relatively high toxicity of chromium to justify more stringent—and therefore more costly—regulation of large chromium electroplaters.[127] Although the technology on which it planned to base the emission standards had "very high costs of control compared to the associated chromium emission reductions," those high costs of control were "reasonable" according to the Agency when weighed against, among other things, the "high toxicity of chromium," which was 1500 times more toxic than benzene.[128]

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124. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants Phosphoric Acid Manufacturing and Phosphate Fertilizers Production, 64 Fed. Reg. 31,358, 31,369 (June 10, 1999) (to be codified at 40 C.F.R. pts. 9 & 63) (declining to impose stringent technology because "the costs would be unreasonable"); Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards: Pulp, Paper, and Paperboard Category; National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production, 58 Fed. Reg. 66,078, 66,141 (proposed Dec. 17, 1993) (to be codified at 40 C.F.R. pts. 63 & 430) ("The cost-effectiveness of [a particular technology] is thus unreasonable for the additional [hazardous air pollutant] emission reductions achieved, and EPA rejected this option from further consideration."); National Emission Standards for Hazardous Air Pollutants; Proposed Standards for Hazardous Air Pollutant Emissions from Magnetic Tape Manufacturing Operations, 59 Fed. Reg. 11,662, 11,677 (proposed Mar. 11, 1994) (to be codified at 40 C.F.R. pt. 63) (similar); National Emission Standards for Hazardous Air Pollutants (Secondary Lead Smelters), 59 Fed. Reg. 29,750, 29,763 (proposed June 9, 1994) (to be codified at 40 C.F.R. pt. 63) (similar); National Emission Standards for Hazardous Air Pollutants for Wet-Formed Fiberglass Mat Production, 65 Fed. Reg. 34,278, 34,286 (proposed May 26, 2000) (to be codified at 40 C.F.R. pt. 63) (similar).

125. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants for Source Categories; National Emission Standards for Hazardous Air Pollutants for Steel Pickling Facilities—HCl Process, 62 Fed. Reg. 49,052, 49,062 (proposed Sept. 18, 1997) (to be codified at 40 C.F.R. pt. 63).

126. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants: Oil and Natural Gas Production and Natural Gas Transmission and Storage, 63 Fed. Reg. 6288, 6306 (proposed Feb. 6, 1998) (to be codified at 40 C.F.R. pt. 63).

127. National Emission Standards for Hazardous Air Pollutants; Proposed Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks, 58 Fed. Reg. 65,768, 65,790 (proposed Dec. 16, 1993) (to be codified at 40 C.F.R. pt. 63).

128. *Id. See also* National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks, 60 Fed. Reg. 4948, 4954 (Jan. 25, 1995) (to be codified at 40 C.F.R. pts. 9 & 63) ("Although [the] costs may seem high, the EPA believes the toxicity of chromium justifies these costs.").

The Agency also cited the high toxicities of cadmium and lead as justification for more stringent and costly regulation of cement kilns fueled with hazardous wastes.[129] EPA stated in its proposed rule that the "primary factor" in its decision to impose a technology more stringent than the mandatory floor was "cost-effectiveness," explaining that if "the Agency's economic analysis suggested that [beyond-the-floor] levels could be cost-effectively achieved (*particularly if significant health benefits would result from a lower emission level*), then an applicable [beyond-the-floor] emission level control technology was identified to achieve that level."[130] Consequently, in its final determination, EPA indeed imposed a technology more stringent and costly than the floor because even though the cost-effectiveness was "relatively poor," the reduced "lead and cadmium emissions . . . are particularly toxic."[131]

Similarly, EPA has relied on a pollutant's toxicity, or rather the lack of it, to justify *less* stringent regulation, rejecting available but expensive technologies if their risk reduction benefits were judged to be relatively low compared to their costs. For phosphoric acid manufacturers, for example, the Agency found the "estimated health risks" from hydrogen fluoride to be "minimal," and concluded that "[n]one of the health impact analyses for existing sources indicated a need to control emissions beyond the levels corresponding to the MACT floors."[132] Likewise, in a proposed rule for endocrine disruptors emitted by manufacturers of the active ingredients in pesticides, EPA indicated "that the existing information on emissions and health effects" of those pollutants did not appear to "justify the additional cost of more stringent standards."[133]

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129. National Emission Standards for Hazardous Air Pollutants: Final Standards for Hazardous Air Pollutants for Hazardous Waste
Combustors, 64 Fed. Reg. 52,828, 52,882 (Sept. 30, 1999) (to be codified at 40 C.F.R. pts. 60, 63, 260, 261, 264, 265, 266, 270 & 271).

130. Revised Standards for Hazardous Waste Combustors, 61 Fed. Reg. 17,358, 17,368 (proposed Apr. 19, 1996) (to be codified at 40 C.F.R. pts. 60, 63, 260, 261, 264, 265, 266, 270 & 271) (emphasis added).

131. National Emission Standards for Hazardous Air Pollutants: Final Standards for Hazardous Air Pollutants for Hazardous Waste
Combustors, 64 Fed. Reg. at 52,882. *See infra* text accompanying notes 175-77 for a discussion of subsequent judicial challenges to this rule, including, perhaps, a challenge to these very toxicity considerations.

132. National Emission Standard for Hazardous Air Pollutants Phosphoric Acid
Manufacturing and Phosphate Fertilizers Production, 61 Fed. Reg. 68,430, 68,437 (proposed Dec. 27, 1996) (to be codified at 40 C.F.R. pt. 63).

133. National Emission Standards for Hazardous Air Pollutants Pesticide Active

To help determine how a pollutant's toxicity should affect the Agency's assessment of a technology's risk reduction benefits, EPA also specifically solicited relevant comments from interested parties. For example, in the proposed rule just mentioned, the Agency requested "comments on whether the risk posed by endocrine disruptors warrants more stringent requirements,"[134] and in its final rule, having received no comments urging tighter controls, EPA reconfirmed its preliminary decision not to impose emission limits beyond the mandatory floor.[135] Moreover, in a rule for cement kilns that burned nonhazardous wastes, the Agency proposed only the mandatory floor for emissions of dioxins and furans, but "solicit[ed] comments on whether a [beyond-the-floor] standard would be appropriate" for those pollutants because they "are some of the most toxic compounds known due to their bioaccumulation potential and wide range of health effects at exceedingly low doses, including carcinogenesis."[136] The Agency also asked commenters whether stringent standards were warranted for emissions of mercury, another highly toxic pollutant, from those kilns.[137] In the final rule, after receiving and evaluating comments both for and against more stringent limits, the Agency declined to set beyond-the-floor standards for those three pollutants.[138]

In the selected rules discussed above, the Agency's consideration of the technologies' risk reduction benefits conformed to the letter and spirit of the APA. Pursuant to the APA, to ensure EPA's accountability through transparent rulemaking, the Agency must explain the factors on which it bases a rule, and it must solicit and respond meaningfully to public comments.[139] EPA fulfilled those

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Ingredient Production, 62 Fed. Reg. 60,566, 60,569 (proposed Nov. 10, 1997) (to be codified at 40 C.F.R. pt. 63).

134. *Id.*

135. National Emission Standards for Hazardous Air Pollutants: Pesticide Active Ingredient Production, 64 Fed. Reg. 33,550, 33,586 (June 23, 1999) (to be codified at C.F.R. pts. 9 & 63).

136. National Emission Standards for Hazardous Air Pollutants; Proposed Standards for Hazardous Air Pollutants Emissions for the Portland Cement Manufacturing Industry, 63 Fed. Reg. 14,182, 14,201 (proposed Mar. 24, 1998) (to be codified at 40 C.F.R. pt. 63).

137. *Id.* at 14,202 ("Mercury is one of the more toxic metals known due to its bioaccumulation potential and the adverse neurological health effects at low concentrations especially to the most sensitive populations at risk (i.e., unborn children, infants and young children).").

138. National Emission Standards for Hazardous Air Pollutants for Source Categories; Portland Cement Manufacturing Industry, 64 Fed. Reg. 31,898, 31,917 (June 14, 1999) (to be codified at 40 C.F.R. pt. 63) (for dioxins and furans); *id.* at 31,918 (for mercury).

139. *See supra* text accompanying notes 77-80. *See also* 42 U.S.C. § 7607(d)(3)(A), (C) (2000) (procedures for rulemaking under the Clean Air Act requiring the Agency to include "a

obligations by (1) explaining in the *Federal Register* notices the toxicities of the pollutants at issue and how the risks they posed affected the Agency's choice of MACT standards for the industries under review, and (2) seeking and responding to public comments on these issues.

2. In Most MACT Rulemakings, Hidden Use by the Agency of Widely Available Toxicity Data in Contravention of the APA

The Agency's openness in the above examples stands in sharp contrast to its approach for the majority of the MACT rules, in which it did not explicitly discuss pollutant toxicities as a factor in its decisionmaking and yet almost certainly took them into account. The Agency had at its disposal a wealth of information about the harms caused by the hazardous air pollutants regulated under the MACT program, and while Congress had directed EPA to gather much of that information for other purposes, it is difficult to believe that the Agency did not rely on the data at all when determining the risk reduction benefits of the technologies studied in all its MACT rules.

Section 112(e)(2)(A) of the Clean Air Act, for instance, required EPA to consider "the known or anticipated adverse effects of such [hazardous air] pollutants" emitted by all the different regulated industries when deciding which industrial sectors should be given higher priority in the standard setting process.[140] To implement that mandate EPA developed a "Source Category Ranking System" based primarily on two elements: (1) estimates of the quantity of emissions from an industry; and (2) estimates of the toxicity of its hazardous air pollutants.[141] For the latter, EPA relied on toxicity information available from several databases that collect the results of laboratory animal studies or epidemiological analyses of workers or residents ex-

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summary of the factual data on which the proposed rule is based . . . and the major legal interpretations and policy considerations underlying the proposed rule"); *id.* § 7607(d)(6)(B) (requiring EPA to respond "to each of the significant comments, criticisms, and new data submitted . . . during the comment period").

140. 42 U.S.C. § 7412(e)(2)(A).

141. National Emission Standards for Hazardous Air Pollutants; Availability: Draft Schedule for the Promulgation of Emission Standards, 57 Fed. Reg. 44,147, 44,150-53 (proposed Sept. 24, 1992) (to be codified at 40 C.F.R. pt. 63) (describing the "exposure score" and the "health effects score"); National Emission Standards for Hazardous Air Pollutants Schedule for the Promulgation of Emission Standards Under Section 112(e) of the Clean Air Act Amendments of 1990, 58 Fed. Reg. 63,941, 63,943 (Dec. 3, 1993) (final schedule).

posed to a pollutant.[142] Data estimating reproductive toxicity, acute lethality and other noncarcinogenic adverse health effects, for instance, are available from the Registry of Toxic Effects of Chemical Substances, maintained by the National Institute of Occupational Safety and Health.[143]

EPA used similar toxicity data to identify nearly 50 "high-risk pollutants" as part of the "early reductions" program under section 112(i)(5)(E) of the Clean Air Act.[144] That program allowed a facility to avoid MACT regulations for a certain number of years if it substantially reduced its emissions voluntarily by an early deadline, but facilities received less credit for reducing emissions of those high-risk pollutants.[145] Not only did the Agency identify the high-risk pollutants, but it also ranked their toxicities relative to each other, assigning numerical indicators that signified whether the pollutant posed a high, medium, or low risk.[146]

Even more extensive risk information was gathered by EPA to implement two special statutory provisions that excused sources from the MACT standards under certain limited circumstances. Under section 112(c)(9)(B) of the Clean Air Act, EPA could choose not to set MACT standards for an industry if, *inter alia*, its hazardous air pollutants did not "cause a lifetime risk of cancer greater than one in one million to the individual in the population who is most exposed to emissions" from that type of source.[147] Likewise, under section

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142. National Emission Standards for Hazardous Air Pollutants; Availability: Draft Schedule for the Promulgation of Emission Standards, 57 Fed. Reg. at 44,153.

143. *Id.* While EPA insists that the prioritization does not indicate relative risk, *id.* at 44,150, that is an overstatement; it would be more accurate to say that the prioritization does not indicate *precisely* the relative risks of the pollutants, given the limited nature of the data that was used.

144. 42 U.S.C. § 7412(i)(5)(E). *See* National Emission Standards for Hazardous Air Pollutants; Compliance Extensions for Early Reductions, 57 Fed. Reg. 61,970, 61,980-85 (Dec. 29, 1992) (to be codified at 40 C.F.R. pt. 63).

145. 42 U.S.C. § 7412(i)(5)(A), (E).

146. National Emission Standards for Hazardous Air Pollutants; Compliance Extensions for Early Reductions, 57 Fed. Reg. at 61,980 (assigning "weighting factor" of 10, 100, or 1000 to each "high risk" pollutant). *See also* National Emission Standards for Hazardous Air Pollutants for Source Categories: Proposed Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants, 56 Fed. Reg. 27,338, 27,354-55 (proposed June 13, 1991) (to be codified at 40 C.F.R. pt. 63) (explaining the weighting factors in proposed early reductions rule).

147. 42 U.S.C. § 7412(c)(9)(B)(i) (allowing an industry to be deleted from EPA's list of regulated entities if it meets this test). For sources emitting noncarcinogens, the Agency could delist an industry if, *inter alia*, its emissions do not "exceed a level which is adequate to protect public health with an ample margin of safety." *Id.* § 7412(c)(9)(B)(ii).

112(d)(4) it could set limits for an industry's noncarcinogenic emissions to levels below the "health thresholds" for those pollutants.[148] To implement both those provisions, EPA conducted quantitative risk assessments that gathered data on the toxicities of the pollutants under study and on many other variables.[149] If, after conducting those analyses for a given industry, the Agency concluded that the exemptions were not available, and MACT standards would be necessary, that risk information would have been available for EPA's use in selecting the "maximum achievable" technology for those sources.

The Agency also had the need to use quantitative risk assessments under section 112(c)(3) to regulate "area sources"—those facilities that emit less than 10 tons per year of any single hazardous air pollutant or 25 tons per year of a combination of those pollutants, making them the smaller industrial facilities under EPA's authority.[150] They are distinguished from "major" sources, which are the large facilities exceeding those threshold emission levels, and an industry might be comprised of both sizes of sources.[151] While the Agency generally had to set MACT standards for all major sources, it was required to regulate area sources only if it found that they presented "a threat of adverse effects to human health or the environment," as determined by quantitative risk assessments.[152] That information—

148. *Id.* § 7412(d)(4) (allowing EPA to set risk-based standards for pollutants "for which a health threshold has been established" if the standard achieves an "ample margin of safety").

149. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants; Proposed Standards for Hazardous Air Pollutants from Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills, 63 Fed. Reg. 18,745, 18,765-67 (proposed Apr. 15, 1998) (to be codified at 40 C.F.R. pt. 63) (explaining how the Agency proposed to implement the authority of section 112(d)(4) for hydrochloric acid emissions from one particular industry); National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products, 68 Fed. Reg. 1276, 1297 (proposed Jan. 9, 2003) (to be codified at 40 C.F.R pt. 63) (conducting "rough" risk assessment for plywood industry to delist a low-risk subcategory pursuant to section 112(c)(9)(B)). *See also* National Emission Standards for Hazardous Air Pollutants for Source Categories: General Provisions, 58 Fed. Reg. 42,760, 42,771-72 (proposed Aug. 11, 1993) (to be codified at 40 C.F.R. pts. 60, 61 & 63) (explaining process for delisting industries under section 112(c)(9)(B), including the use of risk assessments).

150. 42 U.S.C. § 7412(c)(3); *id.* § 7412(a)(2) (defining "area" source as not a "major" source); *id.* § 7412(a)(1) (defining "major" source).

151. *Id.* § 7412(a)(1) (defining "major" source). *See* Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990, 57 Fed. Reg. 31,576, 31,586 (July 16, 1992) (describing industrial categories as containing both area and major sources).

152. *See* 42 U.S.C. § 7412(c)(3); Initial List of Categories of Sources Under Section 112(c)(1) of the Clean Air Act Amendments of 1990, 57 Fed. Reg. at 31,587 ("In the findings accompanying the area source listings in today's notice, quantitative assessments of risk are an important consideration . . . ."). EPA initially chose to list and regulate five area source categories. *Id.* at 31,586. Then, as it proceeded to consider MACT standards for various major source categories,

while perhaps technically related solely to the area sources within an industrial category—would no doubt have been available for EPA's selection of the MACT standards for the major sources within the same category.

It is certainly reasonable to conclude that the Agency would have used this extensive information about the hazardous air pollutants' adverse health effects to inform its assessment of the risk reduction benefits available through regulation, especially when EPA had candidly acknowledged in some of its earliest MACT rules (and later ones as well) that a pollutant's relative toxicity influenced the Agency's choice of the "maximum achievable" technology for an industry.[153] Weighing a pollutant's toxicity in the MACT program also would have been consistent with the Agency's approach under the similarly structured BAT program of the Clean Water Act, where it tailored the standard setting process to demand more stringent (and

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it decided now and then to add other area source categories to the list of regulated entities. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants from Secondary Lead Smelting, 60 Fed. Reg. 32,587, 32,592 (June 23, 1995) (regulating area sources engaged in secondary lead smelting).

153. *See supra* text accompanying notes 123-38. That EPA was likely considering the toxicities of the pollutants emitted by regulated entities when determining whether to impose beyond-the-floor MACT standards is also suggested by the controversial proposals in some of the most recent MACT standards to exempt individual "low-risk" facilities. *See EPA Approves Brick, Clay Emission Limits Without Exemption for Low-Risk Facilities*, 34 ENV'T REP. 518 (BNA) (Mar. 7, 2003) (summarizing proposals for the brick and structural clay industry and for five other industrial categories). The proposals were fiercely criticized as contrary to the Agency's statutory authority. *Id.* EPA subsequently finalized the MACT standards for the brick and structural clay industry without including the exemption for low-risk facilities. National Emission Standards for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing; and National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing, 68 Fed. Reg. 26,690, 26,694-96 (May 16, 2003) (to be codified at 40 C.F.R. pt. 63). However, it published a final rule for industrial boilers, exempting low-risk facilities, that has been challenged by environmental organizations. National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters, 69 Fed. Reg. 55,218 (Sept. 13, 2004) (to be codified at 40 C.F.R. pt. 63). *See Coalition's Lawsuit Charges EPA Too Lax on Toxic Standards for Industrial Boilers*, 35 ENV'T REP. 2384 (BNA) (Nov. 19, 2004). EPA also published a final rule for plywood manufacturers that delists a low-risk subcategory of that industry pursuant to section 112(c)(9)(B) of the Clean Air Act. National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products; Effluent Limitations Guidelines and Standards for the Timber Products Point Source Category; List of Hazardous Air Pollutants, Lesser Quantity Designations, Source Category List, 69 Fed. Reg. 45,944, 45,984 (July 30, 2004) (to be codified at 40 C.F.R. pts. 63 & 429). *See supra* text accompanying note 153 (discussing that delisting authority). That rule also has been challenged by environmental groups. *See EPA Sued Over Risk-Based Exemption in Air Toxics Emissions Limits for Plywood*, 35 ENV'T REP. 2048 (BNA) (Oct. 1, 2004).

more costly) technology for the more serious harms and less stringent technology (at less cost) for the less serious harms.[154]

The conclusion that this risk information was informing EPA's MACT decisions is further supported by a handful of statements in the *Federal Register* in which EPA admitted that it considered the harms caused by the pollutants at issue when selecting MACT standards.[155] Those statements arose not in the context of EPA explaining the bases for its MACT decisions, but rather in the Agency's discussions of its compliance with the administrative requirements imposed by Executive Order 13045.[156] That Executive Order, adopted in April 1997, required EPA to analyze the "environmental health or safety effects" of any "economically significant" rule that "concern[s] an environmental health risk or safety risk that . . . may disproportionately affect children."[157] Initially, after the Executive Order was issued, EPA simply asserted that the Order was inapplicable because the MACT program is not based "on health or safety risks," mimicking the Order's language.[158] Later, however, in seven *Federal Register* notices scattered throughout the years between 1999 and 2002, EPA explained that while the floor was set without regard to risk, "a decision to increase the stringency beyond this floor can be partly based on risk considerations,"[159] and "the Agency may consider *the inherent toxicity* of a regulated pollutant."[160]

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154. *See supra* text accompanying notes 65-76.

155. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production, 64 Fed. Reg. 17,555, 17,562 (Apr. 12, 1999) (to be codified at 40 C.F.R. pt. 63).

156. Exec. Order No. 13,045, 62 Fed. Reg. 19,885 (Apr. 23, 1997).

157. *Id.* at 19,887 (§ 5-501) (applying to any "covered regulatory action"); *id.* at 19,885 (§ 2-202) (defining a "covered regulatory action"). An "economically significant" rule is, *inter alia*, one "that has an annual effect on the economy of $100 million or more." *Id.* (§ 2-202(a)).

158. *See, e.g.*, Effluent Limitations Guidelines and New Source Performance Standards for Synthetic-Based and Other Non-Aqueous Drilling Fluids in the Oil and Gas Extraction Point Source Category, 64 Fed. Reg. 5488, 5529 (proposed Feb. 3, 1999) (to be codified at 40 C.F.R. pt. 435) (claiming that the program is merely technology-based, as if that answers the question of whether health risks are considered at all).

159. *See* National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production, 64 Fed. Reg. at 17,562; National Emission Standards for Hazardous Air Pollutants for Polyether Polyols Production, 64 Fed. Reg. 29,420, 29,437 (June 1, 1999) (to be codified at 40 C.F.R. pt. 63); National Emission Standards for Hazardous Air Pollutants for Source Category: Pulp and Paper Production, 65 Fed. Reg. 3907, 3920 (proposed Jan. 25, 2000) (to be codified at 40 C.F.R. pt. 63); National Emission Standards for Hazardous Air Pollutants: Group I Polymers and Resins; Group IV Polymers and Resins, 65 Fed. Reg. 38,030, 38,035 (June 19, 2000) (to be codified at 40 C.F.R. pt. 63); National Emission Standards for Hazardous Air Pollutants for Polyether Polyols Production; Synthetic Organic Chemical Manufacturing Industry; Epoxy Resins Production and Non-Nylon Polyamides Production; and Petroleum Re-

Because this evidence strongly suggests that EPA considered the toxicities of the relevant pollutants in all its MACT rulemakings, it is then also reasonable to conclude that the Agency has violated the APA by failing to reveal those considerations to the public. While the APA requires an agency to explain all the factual and policy bases for its rules,[161] in the bulk of its MACT rules EPA described the risk reduction benefits of the control technologies only in terms of the quantity of pollutants that could be reduced without explaining how the particular health and environmental hazards caused by the pollutants informed its decisionmaking.[162] In most rules, the Agency was simply silent on that issue. It is unclear why EPA chose not to disclose that important aspect of its decisionmaking, although one can surmise that it would generally be easier for the Agency to have one less factor to explain in the *Federal Register*. Whatever the reason, the Agency's failure to reveal the pollutants' relative toxicities as an element of its MACT decisions conflicted with the basic requirements of the APA.

Moreover, EPA has managed to divert public attention away from its *sub silentio* risk considerations by incorrectly suggesting that pollutant toxicities were entirely irrelevant to the MACT program

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fineries, 65 Fed. Reg. 26,491, 26,496 (May 8, 2000) (to be codified at 40 C.F.R. pts. 9 & 63). *See also* Standards of Performance for Bulk Gasoline Terminals and National Emission Standards for Gasoline Distribution Facilities, 67 Fed. Reg. 59,434, 59,440 (proposed Sept. 20, 2002) (to be codified at 40 C.F.R. pts. 60 & 63) (The decision to go beyond the floor "can be partly based on risk-type considerations, *although EPA does not conduct true risk assessments* when deciding to regulate beyond the MACT floor under section 112(d)(2).") (emphasis added).

160. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants: Pesticide Active Ingredient Production, 64 Fed. Reg. 33,550, 33,588 (June 23, 1999) (to be codified at 40 C.F.R. pts. 9 & 63) (emphasis added). What is particularly curious about those seven rules is that almost all of them were merely technical amendments to MACT standards adopted in earlier years and involve no decisions on whether to impose a beyond-the-floor limit.

161. *See supra* text accompanying note 79. *See also* 42 U.S.C. § 7607(d) (2000) (establishing procedures for rulemaking under the Clean Air Act similar to the APA).

162. To be sure, in the opening of most of its MACT preambles, the Agency briefly described the anticipated adverse health effects of exposure to the pollutants released by the industry under review. As just one example, in a 1996 proposed rule, EPA described the effects of methylene chloride, which causes short-term effects including reversible "nervous system symptoms such as decreased visual and auditory functions" and long-term effects in "the liver, kidney and cardiovascular system[s]" of laboratory animals. *See* National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production, 61 Fed. Reg. 68,406, 68,407-08 (proposed Dec. 27, 1996) (to be codified at 40 C.F.R. pt. 63) (also emphasizing that the agency has not conducted a "detailed and intensive risk assessment of [the] potential [health] effects"). But what the Agency did *not* do is explain anywhere in the rulemakings exactly how that toxicity information affected the Agency's judgment as to which candidate technology's costs were warranted.

because a MACT "standard is not based on health risk,"[163] and "we do not consider health risks in determining MACT."[164] Those claims were plainly inconsistent with the Agency's inherent need to consider risk reduction benefits to select technology-based standards and with EPA's own admissions in other MACT rules that it *was* considering the benefits generally and the relative toxicities of the pollutants, in particular, as part of the measure of those benefits.[165] Unfortunately, judges have tacitly approved EPA's mischaracterizations by repeatedly describing a dichotomy between the technology-based MACT program, on the one hand, and the health-based or—in the words of the courts—"risk-based" programs of the Clean Air Act, on the other, from which they have inferred that information about health and environmental risks (including the toxic characteristics of the pol-

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163. *See* National Emission Standards for Hazardous Air Pollutants for Source Categories; Portland Cement Manufacturing Industry, 64 Fed. Reg. 31,898, 31,919 (June 14, 1999) (to be codified at 40 C.F.R. pt. 63) (rejecting suggestion by commenter that EPA should restrict hydrogen chloride emissions from cement plants because they posed a threat to public health). What is particularly frustrating about that statement is that it came in the same rulemaking where EPA had earlier solicited comments on whether a stringent standard should be set for dioxins, furans, and mercury because they were extremely toxic. *See supra* text accompanying notes 136-37. Interestingly, the Sierra Club challenged this rulemaking, but did not raise the problem of EPA's inconsistent statements. Nat'l Lime Ass'n v. EPA, 233 F.3d 625 (D.C. Cir. 2000).

EPA took similarly inconsistent positions in the MACT standards for electroplaters. The Agency justified stringent standards for *large* electroplaters in part because of the "high toxicity of chromium." *See supra* text accompanying notes 127-28. For *small* electroplaters, however, the Agency rejected a commenter's suggestion that tighter emission limits were required to address the risks posed by the pollutants at issue. National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks, 60 Fed. Reg. 4948, 4954 (Jan. 25, 1995) (to be codified at 40 C.F.R. pts. 9 & 63). It claimed that it was "premature" to be considering risks because a future program, the Residual Risk program, would address them. *Id.*

164. *See* National Emission Standards for Hazardous Air Pollutants: Generic Maximum Achievable Control Technology (Generic MACT), 64 Fed. Reg. 34,854, 34,859-60 (June 29, 1999) (to be codified at 40 C.F.R. pt. 63) (responding to public comment suggesting that, to set a MACT limit, EPA had to do a "cost-benefit evaluation . . . of the incremental costs and benefits of additional controls as compared to the MACT floor," and that the evaluation should reflect the potential "health benefits" of regulation). If EPA was trying to suggest that it does not consider the *precise* health risks posed by a regulated entity, then perhaps its statement was accurate, but as written, it was overbroad as compared, say, to the Agency's admissions in other contexts that the agency considers risk, just not risk established through full, quantitative risk assessments. *Cf.* Standards of Performance for Bulk Gasoline Terminals and National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations), 67 Fed. Reg. 59,434, 59,440 (proposed Sept. 20, 2002) (to be codified at 40 C.F.R. pts. 60 & 63 (The decision to go beyond the floor "can be partly based on risk-type considerations, *although EPA does not conduct true risk assessments* when deciding to regulate beyond the MACT floor under section 112(d)(2).") (emphasis added).

165. *See supra* text accompanying notes 123-38.

lutants) has no bearing whatsoever on the MACT standards.[166] That dichotomy is false.

C. *The False Dichotomy and the Failure of Courts to Recognize EPA's Inherent Need to Consider Risk Reduction Benefits in the MACT Program*

The courts supposedly have found that dichotomy when they compare the MACT program to two other statutory schemes that also have regulated or will soon regulate hazardous air pollutants. The first is the pre-1990 Clean Air Act regime that required EPA to set emission standards that provided an "ample margin of safety to protect the public health."[167] The second is the "Residual Risk" program, adopted by Congress in 1990 as a supplement to the MACT program, which directs EPA to set standards that provide (in language identical to the pre-1990 program) an "ample margin of safety" to protect the public health from the emissions remaining after industrial sources comply with the MACT standards.[168]

Clearly those two health-based programs differ in a key respect from the technology-based MACT standards: to specify an "ample margin of safety" to protect the public health EPA conducts quantitative risk assessments that rely not only on careful estimations of the toxic effects of pollutants, but also on analyses of population characteristics, exposure routes, and other factors in an attempt to calculate precisely the harms from an industry to nearby residents.[169] To select the "maximum achievable" technology for an industry, by contrast, EPA does not have to refer to such detailed risk assessments.[170] Nevertheless, when selecting the "maximum achievable" technologies under the Clean Air Act, just as when selecting the "best available" technologies under the Clean Water Act, EPA must have some general sense of the ability of technologies to reduce public health and environmental risks; otherwise, it would have no way of knowing

166. *See, e.g.*, Sierra Club v. EPA, 353 F.3d 976, 980 (D.C. Cir. 2004); Cement Kiln Recycling Coal. v. EPA, 255 F.3d 855, 872 (D.C. Cir. 2001); Chem. Mfrs. Ass'n v. EPA, 217 F.3d 861, 862 (D.C. Cir. 2000); Nat'l Mining Ass'n v. EPA, 59 F.3d 1351, 1352 (D.C. Cir. 1995).

167. 42 U.S.C. § 7412(b)(1)(B) (1988) (amended 1990).

168. 42 U.S.C. § 7412(f)(2)(A) (2000) (requiring "ample margin of safety" standards to be adopted within eight years of the first round of MACT standards).

169. *See supra* text accompanying note 111.

170. *See supra* text accompanying notes 113-14.

which ones are the "maximum achievable" for the industries under review.[171]

The distinction, then, between the programs that demand an "ample margin of safety" to protect public health, on the one hand, and the MACT program, on the other, is not *whether* EPA considers the public health and environmental risks from regulated entities at all, but *how* it considers that factor. The health-based programs rely on precise, quantitative assessments of those risks. The technology-based MACT standards, on the other hand, only need to use imprecise measures of the risks and the corresponding risk reduction benefits, as indicated by nothing more than the quantity of pollutant that could be eliminated and its relative toxicity.[172]

Courts, however, have routinely described the MACT program as distinct from the "risk-based" or "health-based" programs,[173] suggesting they would agree with EPA's claims that it does not consider risk reduction benefits, including pollutant toxicities, in its MACT rulemakings.[174] In fact, two decisions by the United States Court of Appeals for the District of Columbia Circuit, though not directly on point, have strongly implied that the Agency may *not* legally consider those factors. In *Cement Kiln Recycling Coalition* ("*CKRC*") *v. EPA*, the D.C. Circuit heard challenges to the MACT standards for cement kilns, which happened to be one of the few rules where EPA expressly indicated that the toxic effects of the pollutants justified a particularly stringent technology.[175] Although the court did not directly

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171. *See supra* text accompanying notes 54-56. *Cf. Chem. Mfrs. Ass'n*, 217 F.3d at 866 (noting that "the Clean Air Act's purpose is to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare," citing 42 U.S.C. § 7401(b)(1), and chastising EPA for failing to make any findings that a particular rule would provide any public health or environmental benefits).

172. While EPA would only need to use very simple risk information to select the "maximum achievable" technology, the Agency, in fact, had the opportunity to use more specific risk information, as noted earlier, because it was also conducting fairly detailed risk assessments to implement the "area source" standards and other provisions of section 112. *See supra* text accompanying notes 147-52.

173. *See Chem. Mfrs. Ass'n*, 217 F.3d at 862 (explaining that the MACT program foregoes a "risk-based approach"); Cement Kiln Recycling Coal. v. EPA, 255 F.3d 855, 857 (D.C. Cir. 2001) (describing the MACT program as separate from the "risk-based" program in place prior to 1990); Nat'l Mining Ass'n v. EPA, 59 F.3d 1351, 1353 (D.C. Cir. 1995) (noting Congress' dissatisfaction with the pre-1990 "health-based regulation" and its decision to replace that scheme with a technology-based program).

174. *See supra* text accompanying notes 163-64.

175. 255 F.3d 855 (D.C. Cir. 2001). As noted earlier, EPA had decided to impose a stringent technology beyond-the-floor, because, even though the cost-effectiveness was "relatively poor," "the reduced lead and cadmium emissions . . . are particularly toxic." National Emission Stan-

rule on the legality of that justification, it found (for other reasons) that the standards were improper and explained that it would vacate them, rather than simply remanding to the Agency, because "EPA may have exceeded its statutory mandate by relying on policy objectives other than those enumerated in section 7412(d)."[176] What the court viewed as the improper "policy objectives" is unclear,[177] but the judges may very well have been signaling their (inaccurate) view that EPA did not have authority to weigh a pollutant's toxicity in the MACT standard setting process.

In the second noteworthy case, *Sierra Club v. EPA*, the environmental challengers argued that the MACT standards for primary copper smelters were not stringent enough because copper in the atmosphere eventually settles into waterways and onto land, where it can cause various adverse effects.[178] They claimed that section 112(d)(2) of the Clean Air Act, which directs the Agency to take into consideration the "non-air quality health and environmental impact[s]" of a control technology when selecting a MACT standard, required EPA to take into account those non-air impacts of the hazardous air pollutants emitted by the smelters.[179] The court disagreed, finding that the provision compelled the Agency only to consider the impacts to lands and waters where the *waste byproducts* generated from air pollution control devices are disposed, not where the hazardous air pollutants themselves deposit.[180] Although technically the

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dards for Hazardous Air Pollutants: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. 52,828, 52,882 (Sept. 30, 1999) (to be codified at 40 C.F.R. pts. 60, 63, 260, 261, 264, 265, 266, 270 & 271). *See supra* text accompanying notes 129-31.

176. *Cement Kiln Recycling Coal.*, 255 F.3d at 872.

177. Whether the consideration of the high toxicity of the pollutants was the improper "policy objective" is unclear because EPA had also taken the position in the rulemaking that a beyond-the-floor standard would create a "strong incentive for waste minimization of lead and cadmium sent for combustion," would "support[] our Children's Health Initiative," and would be consistent with European Union standards—all of which arguably are outside the scope of the factors Congress expected the Agency to consider when setting MACT standards. National Emission Standards for Hazardous Air Pollutants: Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. at 52,882.

178. 353 F.3d 976, 990 (D.C. Cir. 2004).

179. *Id.* (citing 42 U.S.C. § 7412(d)(2) (2000)).

180. *Id.* That ruling is correct. The reference to "non-air quality health and environmental impacts" first appeared in the Clean Air Act in 1977 in the provision directing EPA to set New Source Performance Standards ("NSPS"), which are another set of technology-based standards similar to the MACT standards. Pub. L. No. 95-95, § 109(a), 91 Stat. 698 (codified as amended at 42 U.S.C. § 7411(g)(4)(B)). The NSPS provision originally required the Agency to find the "best" technology considering only costs, but in 1977 Congress expanded the list of factors to include non-air quality impacts and energy demands to affirm two opinions issued by the United States Court of Appeals for the District of Columbia Circuit: Portland Cement Ass'n v. Ruckel-

case did not address whether, in a MACT rule, EPA can take note of an air pollutant's toxic effects directly in the atmosphere, the court used sweeping language that at least suggests the Agency has no authority to do so, writing that MACT standards should not reflect "an assessment of the risks posed by" the hazardous air pollutants and sources under review[181] and that the "technology-based/risk-based distinction" is "at the heart of the Act."[182]

As support for that distinction, the *Sierra Club* court quoted from a Senate report accompanying the 1990 Amendments to the Clean Air Act that described the MACT standards as "based on the performance of technology, and not on the health and environmental effects of hazardous air pollutants."[183] That is an overstatement. The

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shaus, 486 F.2d 375 (D.C. Cir. 1973) and Essex Chem. Corp. v. Ruckelshaus, 486 F.2d 427 (D.C. Cir. 1973). Pub. L. No. 95-95, § 109(a), 91 Stat. 698 (codified as amended at 42 U.S.C. § 7411(g)(4)(B)). Those cases dealt with the question of whether, under the NSPS provision, EPA could decline to declare a technology "best" if it would significantly reduce air pollution but would create substantial amounts of waste byproducts that would have to be disposed of in landfills or in waterways. *See, e.g.*, *Essex Chem.*, 486 F.2d at 439 (discussing how potential use of "sodium sulfite-bisulfite scrubbers" would lead to "significant land or water pollution" resulting from disposal of byproducts). Both courts concluded that Congress must have meant the Agency to consider such "counter-productive environmental effects of a proposed standard" because otherwise, in the words of one court, the term "'best' could apply to a system which did more damage to water than it prevented to air." *Portland Cement*, 486 F.2d at 385, n.42; *Essex Chem.*, 486 F.2d at 439. As a committee of the United States House of Representatives wrote in a 1977 report accompanying the proposed amendments to the Clean Air Act, the courts' interpretations were "implicit in the previous [statutory] language" but the NSPS provision needed to be amended so as to expressly direct EPA to take account of non-air quality impacts to make clear that "the term 'best system' necessarily involves consideration of factors such as water and land impacts of the system." COMM. ON INTERSTATE AND FOREIGN COMMERCE, CLEAN AIR ACT AMENDMENTS OF 1977: REPORT BY THE COMMITTEE ON INTERSTATE & FOREIGN COMMERCE TO ACCOMPANY H.R. 6161 TOGETHER WITH ADDITIONAL, SEPARATE, AND SUPPLEMENTAL VIEWS, H.R. REP. NO. 95-294, at 190 (1977), *as reprinted in* 1977 U.S.C.C.A.N. 1077, 1269.

181. *Sierra Club*, 353 F.3d at 980.

182. *Id.*

183. *Id.* (quoting S. Rep. No. 101-228, at 148 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3533). The legislative history includes several other similar statements that suggest that risk is irrelevant to the MACT program. For instance, Senator Steven D. Symms (R-Idaho) stated that the MACT standards are to be determined "regardless of whether the hypothetical risk is large, small or negligible." 136 CONG. REC. 36,016 (1990). Likewise, Representative William Dannemeyer (R-Calif.) stated: "The legislation requires EPA to establish [MACT] emission standards for cancer-causing chemicals without regard to toxicity or human exposure." 136 CONG. REC. 35,054 (1990).

Those statements, however, were offered to criticize the MACT standards' failure to consider the risk posed by *individual* members of an industrial sector, without speaking to whether risk at all—even on a category-wide basis—would be considered in the MACT standards. The House had passed a bill that would have offered any individual member of a regulated industrial category an exemption from the MACT standards if it could show, *through a site-specific quanti-*

pollutants' effects would be completely irrelevant only if Congress had directed EPA to set all MACT standards at nothing more than the congressionally imposed *floor*, which requires, *inter alia*, all existing facilities in the same industrial category to meet the average emission limit achieved by the top 12% of the industry.[184] To set that floor, the Agency would not have to evaluate the risks from the pollutants and sources under study (or, for that matter, the costs of reducing those risks), and that Senate statement may very well have been trying to highlight the special nature of the floor. But once Congress asked EPA to decide whether to impose MACT standards more stringent than the floor, then the Agency must have some general notion, however vague, of the adverse health and environmental harms caused by the regulated entities and the corresponding risk reduction benefits of pollution controls.[185]

In short, courts wrongly see a fundamental dichotomy between the health-based or risk-based programs of the Clean Air Act and the MACT program, incorrectly believing that considerations of risk are entirely irrelevant to the latter. That judicial mischaracterization parallels—and, indeed, facilitates—EPA's own false claims that its MACT rules do not take into account pollutant toxicities when estimating the benefits of regulation.

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tative risk assessment, that it posed no more than a certain specified level of risk to human health. H.R. 3030, 101st Cong. (2d Sess. 1990) (adding section 112(g), which allowed a source an "alternative emission limitation" if it could show, for carcinogens, that it poses no more than a one in one million risk of cancer to the "actual person who is most exposed to [its hazardous air pollutant] emissions" and, for noncarcinogens, show that its emissions "do not exceed a level which is adequate to protect public health with an ample margin of safety"). The Senate bill had no such site-specific exemption for low-risk facilities. In the final bill agreed to by both chambers, the House agreed to drop that provision. Instead, the law generally required all members of the same industrial category to be subject to the same MACT standard. *See* 136 CONG. REC. 36,060 (1990) (statement of Sen. Durenberger) ("the House receded to the Senate on this point [and t]he provision was deleted in conference").

184. *See supra* text accompanying notes 116-18 (discussing 42 U.S.C. § 7412(d)(3)).

185. *See supra* text accompanying notes 119-22. Thus, the more accurate legislative statement came from Representative James R. Rowland, Jr., who stated that Congress had "made risk assessment *largely* irrelevant" to the MACT standard setting process, suggesting quite appropriately that risk itself—as opposed to the more precise calculations of a risk assessment—was not *entirely* irrelevant to the MACT program. *See* 136 CONG. REC. 35,379 (1990) (emphasis added).

IV. THE NEED FOR STATUTORY AMENDMENTS TO PREVENT EPA FROM THWARTING THE APA WHEN IT ADOPTS TECHNOLOGY-BASED STANDARDS UNDER THE CLEAN WATER ACT AND THE CLEAN AIR ACT

A significant problem has developed with the technology-based standards adopted under both the Clean Water Act and the Clean Air Act: Aided by incorrect judicial rulings, EPA has been able to thwart APA review of its assessments of the risk reduction benefits offered by candidate technologies—an inherent factor in the Agency's selection of the "best available" or "maximum achievable" pollution control technology for a given industry. The APA anticipates that, to prevent an agency from abusing its discretion, the agency must explain the factual and policy bases for its rules, take and respond to public comments on its proposed rules, and face judicial scrutiny of its decisions.[186] Yet under the Clean Water Act, EPA was able to shield its calculations of the risk reduction benefits from judicial review, successfully convincing the courts that any discussion of those benefits in the *Federal Register* preambles for the various BAT standards was irrelevant to the selection of the "best available" technology.[187] Under the Clean Air Act, the Agency not only avoided judicial review of its MACT benefits calculations, but also withheld that information from the public.[188]

In theory, judges themselves could reverse this trend by recognizing that, even though the ambiguous statutory provisions of the Clean Water Act and the Clean Air Act might suggest otherwise, EPA cannot logically select the "best available" or "maximum achievable" technology for an industry without knowing the benefits of candidate controls, and the Agency's assessment of those benefits necessarily depends on a technology's ability to reduce risks to public health and the environment.[189] In particular, courts would have to understand

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186. *See supra* text accompanying notes 77-82.

187. *See supra* text accompanying notes 84-106.

188. *See supra* text accompanying notes 140-85. *See also* DANIEL A. FARBER, ECO-PRAGMATISM: MAKING SENSIBLE ENVIRONMENTAL DECISIONS IN AN UNCERTAIN WORLD 74, 82-83 (1999) [hereinafter ECO-PRAGMATISM] (discussing "feasibility" analysis, another way of describing the process of selecting technology-based standards, as having the "result . . . that costs and benefits are really being compared, though only covertly" and how the "balancing" between benefits and costs "is forced underground, rather than being explicit").

189. *See supra* text accompanying notes 47-49, 54-56, and 170-71. *See also* SIDNEY A. SHAPIRO & ROBERT L. GLICKSMAN, RISK REGULATION AT RISK: RESTORING A PRAGMATIC APPROACH 32, 37-38 (2003) [hereinafter RISK REGULATION AT RISK] (describing technology-based standards as based on a "constrained balancing" of costs and benefits); Ackerman &

that although Congress only expressly lists costs as the factor by which the Agency should identify the "best available" or "maximum achievable" technologies, a strict application of that statutory language is inappropriate because it would always compel EPA not to choose *any* controls for an industry, since that would be the least costly option, thereby defeating Congress' primary goal for the technology-based programs—to protect public health and the environment.[190] Instead, a consideration of risk reduction benefits is necessarily implied under the statutes so that the Agency can choose the technologies that minimize public health and environmental risks to the extent possible without imposing costs on industrial sources that EPA deems, as a matter of policy, excessive.[191]

Courts would also have to reevaluate the legislative histories of the technology-based standards and adopt the better interpretations of certain equivocal congressional statements. The 1990 Senate Report about the Clean Air Act amendments should be understood to mean that information about the risks from regulated facilities is irrelevant only to the Agency's determination of the MACT floor, not the beyond-the-floor standards.[192] In addition, when Senator Muskie observed in 1972 that under the Clean Water Act EPA need not use a "balancing test" or perform a "cost-benefit analysis" to set BAT standards, he most likely meant that the Agency does not have to find as close a fit between the costs and benefits of a technology to declare it the "best" under the BAT program as it does for the less stringent BPT technology-based standards.[193]

Most judges, however, are unlikely to take such steps after decades of contrary rulings by other courts that, unfortunately, adopted mischaracterizations of the Clean Water Act's and Clean Air Act's technology-based standards. The petitioners in *Texas Oil & Gas*, in fact, urged that court to rethink the long-standing interpretations of the BAT provision, but the Fifth Circuit expressly declined to do so in light of "years of precedent."[194]

Stewart, *supra* note 23, at 1359 n.60 ("The vice of the BAT strategy is that it ignores this inevitable cost-benefit consideration, or at best buries it, by treating it as an engineering decision about technological feasibility.").

190. *See supra* text accompanying notes 54-56, 170-71.

191. *Id.*

192. *See supra* text accompanying notes 183-85.

193. *See supra* text accompanying notes 63-64.

194. Tex. Oil & Gas Ass'n v. EPA, 161 F.3d 923, 936 n.9 (5th Cir. 1998).

Because the entrenched judicial misconceptions of technology-based standards ultimately stem from the confusing language and histories of the two statutes, amending the BAT and MACT statutory provisions is the only way to correct those misconceptions by clarifying what currently is implicit in the statutes: Determining the "best available" or "maximum achievable" technology requires an evaluation of the risk reduction benefits in some fashion. Thus, section 304(b)(2)(B) of the Clean Water Act and section 112(d)(2) of the Clean Air Act should be revised to expressly require EPA, when selecting the "best available" or "maximum achievable" technology, not only to weigh the costs of implementing candidate technologies but also the benefits of reduced risks to public health and the environment offered by them.[195] The Agency would then be required in every BAT or MACT rulemaking, consistent with the APA's demand for transparency, to explain the possible risk reduction benefits from the technologies it studied, and to explain how those benefits affected its choice of "best available" or "maximum achievable" technology for a certain industry. EPA would also have to solicit and respond to public comments on those issues. Finally, judges who mistakenly believe that risk reduction benefits do not relate to the selection of technology-based standards and, as a result, fail to review them or force the Agency to reveal them would now be required to apply the procedural and substantive requirements of the APA to EPA's estimations of those risk reduction benefits, thereby ensuring the oversight necessary to maintain the Agency's accountability.

Critics of this proposal might argue that by adding risk reduction benefits as a new factor in the selection of technology-based standards, the proposed statutory amendments will require EPA to spend

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195. By "costs," I mean both the economic costs and the non-economic detriments previously listed by Congress, namely, the environmental impacts of using a pollution control technology (such as the solid wastes caused by emission controls) and the energy demands. *Cf.* 33 U.S.C. § 1314(b)(2)(B) (2000) and 42 U.S.C. § 7412(d)(2) (2000).

This is not to suggest that the weighing can or must occur through the formalized notion of a "cost-benefit" analysis, in which all positive and negative effects of a regulation are given monetary value. Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1553 (2002). Formal cost-benefit analysis does not make the task of choosing emission standards any more objective or scientific; it simply shifts the value-laden policy choices to the initial attempt to assign monetary values to the effects of the standards. *Id.* at 1576-77. *See also Environmental Strategies*, *supra* note 2, at 180-91 (summarizing criticisms of demands that the costs of regulations be balanced against their benefits). *But see* Colloquy, *Cost-Benefit Analysis Colloquy: Squaring the Vicious Circle*, 53 ADMIN. L. REV. 257-314 (2001) (articles by an influential jurist and three leading scholars defending cost-benefit analysis in one form or another on various grounds).

an inordinate amount of time and resources trying to determine the risks from industrial sources and defending its assessments of those risks in court. After all, the Agency's earlier attempts to calculate those risks under the health-based programs of the Clean Water Act and the Clean Air Act resulted in "paralysis by analysis."[196] Similarly, according to this argument, the new statutory provisions would paralyze EPA's BAT and MACT technology-based programs.

A consideration of the risks posed by regulated entities, however, simply cannot be avoided in a technology-based regulatory regime. What can be avoided under this proposal are the two impediments that substantially delayed EPA's implementation of the earlier health-based programs. First, by failing to limit the type of data the Agency would have to use to identify the harmful air and water pollutants and to set "ample margin of safety" standards under the two statutes, Congress left open the possibility that EPA needed to conduct extensive studies before acting.[197] Second, many courts, when reviewing rules adopted by EPA and the Occupational Safety and Health Administration ("OSHA") under various statutory schemes, compelled the agencies to *fully* and *precisely* assess the risks to be regulated.[198] As Professor Thomas McGarity and others have docu-

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196. References to "paralysis by analysis" are replete in the legal and scientific literature about risk. *See, e.g.*, Douglas J. Crawford-Brown & Kenneth G. Brown, *A Framework for Assessing the Rationality of Judgments in Carcinogenicity Hazard Identification*, 8 RISK: HEALTH, SAFETY AND ENVIRONMENT 307, 313 (1997); Holly Doremus, *The Purposes, Effects, and Future of the Endangered Species Act's Best Available Science Mandate*, 34 ENVTL. L. 397, 415 (2004); Dwyer, *supra* note 110, at 258; Kuehn, *supra* note 111, at 148; Thomas O. McGarity, *The Expanded Debate Over the Future of the Regulatory State*, 63 U. CHI. L. REV. 1463, 1523 (1996); Richard B. Stewart, *Administrative Law in the Twenty-First Century*, 78 N.Y.U. L. REV. 437, 447 (2003).

The "ample margin of safety" standards EPA was required to adopt under the Clean Water Act and the Clean Air Act suffered from such "paralysis by analysis." As noted earlier, in five years EPA only proposed nine "ample margin of safety" standards for toxic water pollutants and finalized none. Latin, *supra* note 34, at 1307-09 (discussing EPA's proposed nine rules). And in twenty years under the Clean Air Act, the Agency only identified eight hazardous air pollutants and adopted "ample margin of safety" standards for a small fraction of the industries emitting those pollutants. *See generally* CLEAN AIR ACT AMENDMENTS OF 1989: REPORT OF THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS U.S. SENATE TOGETHER WITH ADDITIONAL AND MINORITY VIEWS, S. REP. 101-228, at 131 (1989), *as reprinted in* 1990 U.S.C.C.A.N. 3385, 3516 (referencing EPA's delays).

197. *See, e.g.*, Graham, *supra* note 75, at 117 (Because the Clean Air Act "and its legislative history provide no guidance concerning what types of scientific data are required to support a decision to list" an air pollutant as "hazardous," and because of the "regulatory implications of the listing decision," EPA created "a time-consuming and cumbersome process for making the initial decision.").

198. *See Deossifying Rulemaking*, *supra* note 79, at 1402-03. *See also* RISK REGULATION AT RISK, *supra* note 189, at 193-96; JOHN M. MENDELOFF, THE DILEMMA OF TOXIC SUBSTANCE

mented, cases such as the now-famous *Benzene* decision[199] and *Corrosion Proof Fittings*[200]—by which courts gave this "hard look" to OSHA and EPA risk regulations—forced the agencies thereafter to "prepare for the worst-case scenario on judicial review."[201] To respond both to the ambiguous legislation and the demanding courts, EPA spent a great deal of time and resources generating complex quantitative risk assessments packed with details about the dose-response curves for the pollutants, the distances and directions the pollutants traveled in the air, the characteristics of the populations living near regulated entities, and the likely exposure routes.[202]

For the statutory changes proposed here, by contrast, steps can be taken to avoid both of those hindrances. First, Congress should make clear in the legislative history accompanying the new provisions that it expects the BAT and MACT programs to be implemented expeditiously and that, accordingly, the Agency is expected to use whatever risk data are readily available to it, even if they are incomplete or potentially subject to differing interpretations, rather than trying to quantify the exact harms to individuals living near a particular industry by studying all the many different factors that affect risk levels. For instance, EPA might simply rely on information, as it has done already in the BAT and MACT programs, about just two factors: the

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REGULATION: HOW OVERREGULATION CAUSES UNDERREGULATION AT OSHA 14, 115-22 (1988); Mark N. Seidenfeld, *Bending the Rules: Flexible Regulation and Restraints on Agency Discretion*, 51 ADMIN L. REV. 429, 430-31 & n.3 (1999).

199. Indus. Union Dep't v. Am. Petroleum Inst., 448 U.S. 607 (1980).

200. Corrosion Proof Fittings v. EPA, 947 F.2d 1201 (5th Cir. 1991).

201. *Deossifying Rulemaking*, *supra* note 79, at 1402-03, 1410-11, 1419, 1422-23 (describing *Benzene* and *Corrosion Proof Fittings* decisions and hard look review).

202. Dwyer, *supra* note 110, at 279; Graham, *supra* note 75, at 117-19; Kuehn, *supra* note 111, at 107-16.

EPA's efforts, at least under the Clean Air Act, were also delayed by a third impediment that did not relate strictly to any risk considerations. The Agency struggled for years to give practical meaning to the vague statutory mandate that required it to protect the public health with an "ample margin of safety." It feared that if the provision were interpreted to mean that no risk whatsoever could be tolerated from hazardous air pollutants, then its standards would effectively have to shut down many industrial sources of those pollutants. Dwyer, *supra* note 110, at 278 (referring to the "potentially draconian measures on industry"). Unwilling to hamper the nation's economy to that degree, the Agency only issued a few rules that identified pollutants to be regulated and a similarly small number of rules that set "ample margin of safety" standards for those pollutants. *Id.* at 279. For the MACT program, however, Congress itself identified the 189 hazardous air pollutants to be regulated. *See* 42 U.S.C. § 7412(b)(1) (2000). And it allowed—indeed, expected—EPA to decline to impose beyond-the-floor standards if they would be economically disruptive. *See id.* § 7412(d)(2) (EPA must "tak[e] into consideration the cost of achieving" the MACT standard). Hence, the Agency has little incentive to delay MACT rules just to avoid imposing excessive burdens on the regulated community.

quantity of pollutant that a technology could eliminate and the pollutant's relative toxicity, as indicated by previously-developed water quality criteria, by the information maintained in the federal government's *Registry of Toxic Effects of Chemical Substances*, or by any other data.[203] Or, if by chance, the Agency does not even have information about a pollutant's toxicity relative to other contaminants, it might rely on only one factor: the quantity of pollutant to be reduced, assuming it to be no less or more toxic than any other contaminant. Conversely, the Agency might use the results of full quantitative risk assessments if it could conduct them without undue delay, or, more likely, if they have been conducted already for other purposes.[204] The

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203. *See supra* text accompanying notes 65-74, 123-38, and 143 (describing EPA's practices under the Clean Water Act and the Clean Air Act and the Registry of Toxic Effects of Chemical Substances). The federal governmental also maintains other databases of health effects. "Cancer potency factors," for example, are available through the Integrated Risk Information System, a database maintained by EPA. *See* National Emission Standards for Hazardous Air Pollutants for Source Categories: Proposed Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants, 56 Fed. Reg. 27,338, 27,361 (proposed June 13, 1991) (to be codified at 40 C.F.R. pt. 63).

For the notion that even incomplete risk information may be valuable in a regulatory context, see Kuehn, *supra* note 111, at 170 (Under certain circumstances, instead of conducting full scale quantitative risk assessments, "information on the toxic nature of the chemical and the likelihood of exposures would often be sufficient."). *See also* David Roe, *Ready or Not: The Coming Wave of Toxic Chemicals*, 29 ECOL. L.Q. 623 (2002) (arguing for the use of "shortcut" assessments of the toxicity of thousands of industrial chemicals and documenting California's successful use of such limited toxicity inquiries in its regulations).

Reluctance to let EPA use less-than-perfect scientific information about risks might stem from the "science charade"—the claim decisions about environmental regulations can be depoliticized if they are based simply on the "best" scientific information. *See, e.g.*, Wendy E. Wagner, *The Science Charade in Toxic Risk Regulation*, 95 COLUM. L. REV. 1613, 1617 (1995) (describing the "camouflaging [of] controversial policy decisions as science"). As Professor Wagner has so ably demonstrated, environmental decisions always involve political and social values that cannot be avoided, regardless of whether the "best" scientific data or some less sophisticated information is used. *Id.* at 1618-27.

204. For instance, in one rulemaking EPA "reviewed a detailed exposure and risk assessment performed for a source subject to State air toxics requirements." National Emission Standard for Hazardous Air Pollutants Phosphoric Acid Manufacturing and Phosphate Fertilizers Production, 61 Fed. Reg. 68,430, 68,436 (proposed Dec. 27, 1996) (to be codified at 40 C.F.R. pt. 63). In another, early MACT rulemaking, the Agency relied on a quantitative risk assessment it had conducted under the preceding "ample margin of safety" program. *See* National Emission Standards for Hazardous Air Pollutants for Chromium Emissions from Industrial Process Cooling Towers, 58 Fed. Reg. 43,028, 43,032 (proposed Aug. 12, 1993) (to be codified at 40 C.F.R. pt. 63) (explaining that in 1988, only five years before, EPA had done a risk assessment estimating the "annual incidence of cancer cases attributed to this source category," which it then updated for this rule).

EPA will likely have an opportunity to use the risk assessments for the Residual Risk program to inform its MACT standards. Under that program, EPA must promulgate emissions standards to provide an "ample margin of safety" to protect the public health from the emis-

choice would be EPA's, balancing the need for risk information with the need to conduct BAT and MACT rulemakings in a timely fashion.

Second, the courts should likewise allow EPA to use any available information by abandoning the "hard look" review that forced the Agency in the past to use only the most comprehensive and accurate risk data. Instead, jurists should recognize that assessing the risks posed by regulated sources is always an imprecise art, no matter how much data EPA gathers, so that, regardless of whether the Agency estimates the risks by conducting full quantitative risk assessments or by far simpler measures, its methodologies should be given deference by the courts.[205] Although the ongoing scholarly debate about the ways to minimize "hard look" review[206] is beyond the scope of this article, it is worth noting that, in the context of technology-based standards, there is some reason to believe judges would be willing to accept EPA's estimations of a technology's risk reduction benefits based on only limited information. Certainly courts defer to the Agency's use of imperfect data about the costs and technical capabilities of the technologies under study—the other factors that are key to technology-based standards—because they recognize that the legislature expected those standards to be based on whatever infor-

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sions remaining after industrial sources comply with the MACT standards. *See* 42 U.S.C. § 7412(f)(2)(A). The statute calls for both those Residual Risk standards and another round of MACT standards to be adopted eight years after the first round of MACT standards, which means that the Agency will be writing both types of standards concurrently. *Id.* §§ 7412(d)(6), (f)(2)(A). The quantitative risk assessments that EPA will conduct for the Residual Risk program could undoubtedly also influence the MACT rules. Indeed, the second round of MACT standards may be unnecessary, especially because, as I have argued elsewhere, the "ample margin of safety" standards of the Residual Risk program depend not only the health risks of the pollutants and sources at issue but also the control costs (McCubbin, *supra* note 110, at 4-6), just as the MACT standards consider not only the control costs but also the health risks. The interplay between those two programs is fodder for a future article.

205. Indeed, while the judiciary may believe that quantitative risk assessments provide a more scientific or objective basis for EPA's risk regulations, in reality those risk assessments are "anything but scientific, objective [or] credible" because they rely on "about fifty separate assumptions or extrapolations" about which reasonable persons can disagree. Shere, *supra* note 111, at 413. *See also* McCubbin, *supra* note 110, at 22-23 (describing uncertainties of quantitative risk assessments). *See generally* Kuehn, *supra* note 111 (criticizing heavy reliance on quantitative risk assessments).

206. *See, e.g.*, *Deossifying Rulemaking*, *supra* note 79, at 1453 (arguing for deferential review akin to a "pass/fail" test in school); Mendeloff, *supra* note 198, at 234 (arguing that Congress should overrule the *Benzene* decision expressly and require more traditional arbitrary and capricious review).

mation the Agency could gather relatively quickly.[207] If Congress, as suggested above, makes clear that EPA need not have a fully accurate picture of the risks before adopting BAT or MACT standards, so that the programs can be implemented expeditiously, then there is no reason why judges could not also uphold the Agency's reliance on readily available but limited risk information.[208]

To be sure, even if these proposed statutory amendments will not paralyze the BAT and MACT programs, they will slow the process of setting technology-based standards somewhat because EPA will have to spend more time explaining and defending its assessments of the risk reduction benefits available from candidate technologies, which it previously did not reveal to the public (especially in the MACT program) or defend in court (in both programs). Those delays, however, are the price of transparency under the APA. Unless the technology-based provisions of the Clean Water Act and the Clean Air Act are amended to explicitly require the Agency to weigh the risk reduction benefits offered by pollution control technologies, EPA will continue in its BAT and MACT rulemakings to avoid the public and judicial scrutiny so vital to maintaining the Agency's accountability.

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207. *See* Consol. Coal Co. v. Costle, 604 F.2d 239, 243 (4th Cir. 1979) (To adopt technology-based standards under the Clean Water Act, "Congress has required the agency to act quickly and decisively despite a recognized absence of exact data on pollution control technology, and we must hesitate to draw substantive conclusions differing from those of the agency in this area of imprecise knowledge."); Sierra Club v. EPA, 167 F.3d 658, 662 (D.C. Cir. 1999) (in challenge to MACT standards, court noting that "EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem. We generally defer to an agency's decision to proceed on the basis of imperfect scientific information, rather than to 'invest the resources to conduct the perfect study.'"); NRDC v. EPA, 863 F.2d 1420, 1426-27 (D.C. Cir. 1988) (in challenge to BPT standards, court noting that EPA does not have to have "more than a rough idea of the costs the industry would incur," not a "precise measurement of cost"); Reynolds Metals Co. v. EPA, 760 F.2d 549, 565 (4th Cir. 1985) (rejecting petitioner's claim that the actual costs were 350 times higher than EPA's estimates because the "agency has broad discretion in its selection of data and in the method of calculation, particularly when it involves highly scientific or technical considerations"). *But see* Rodgers, *supra* note 13, at 36-37 (recounting courts that were "drawn into a host of micro-judgments" on various aspects of EPA's technology-based standards).

208. This "soft look" review, while substantively deferential, would still help maintain the Agency's accountability by, *inter alia*, ensuring that EPA explained to the public all the factual and policy bases for the rulemakings, thereby facilitating *political* oversight of the Agency.