

GRANDFATHERING AND ENVIRONMENTAL REGULATION: THE LAW AND ECONOMICS OF NEW SOURCE REVIEW

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INTRODUCTION

How should the law introduce a new, more stringent regulation that governs behavior that predates it? Should the law afford relief to actors that

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have been engaging in the behavior since before the new regulation's enactment? If so, in what form? And for how long?

In this Article, we consider these questions in the context of environmental regulation in general and the Clean Air Act in particular. Almost forty years ago, under the 1970 amendments to the Clean Air Act, Congress decided to subject new sources of air pollution to stringent pollution control standards. It "grandfathered" preexisting sources, leaving them free of federal regulation.¹ In the ensuing decade, however, statutory and regulatory development made clear that a "modification" of a grandfathered plant that increased the plant's pollution emissions would subject it to the same federal standards applied to "new sources." The Environmental Protection Agency (EPA) determined on a case-by-case basis what constituted a modification, which triggered the new source standards, and what constituted "routine maintenance, repair, and replacement," which did not.

In December 2002 and October 2003, the Bush Administration adopted regulatory revisions that significantly extended the grandfathering of old plants. One regulation allows plant owners more flexibility in determining the baselines against which changes in pollution emissions levels are measured. This change decreases the number of modifications that are deemed to result in increased pollution emissions levels and, thus, that are subject to the New Source Review (NSR) program. The other regulation provides a safe harbor for modifications and renovations of grandfathered plants that cost less than twenty percent of the replacement cost of a grandfathered unit. The Administration justified these regulations by noting that the uncertainty of the existing case-by-case standard discouraged owners from undertaking desirable plant renovations. The new regulations, the Administration declared, would resolve this uncertainty without impairing environmental quality.

Environmentalists, and some states, challenged the new regulations, arguing that they extend the lives of obsolescent plants that should be taken out of service. Most of the regulations' provisions have survived judicial scrutiny. However, the United States Court of Appeals for the District of Columbia Circuit invalidated the twenty percent safe harbor.² Even with respect to this invalidated regulation, however, the story continues. First, the Administration filed a certiorari petition, which the Supreme Court denied on April 30, 2007.³ Nonetheless, the EPA has indicated that in any event it may apply the safe harbor in its case-by-case analysis of whether to bring

¹ For a discussion of the history of "grandfather clauses" and "grandfathering" from their origins in the context of voting rights through their current usage in broad areas of law including environmental regulation, see Heidi Gorovitz Robertson, *If Your Grandfather Could Pollute, So Can You: Environmental "Grandfather Clauses" and Their Role in Environmental Equity*, 45 CATH. U. L. REV. 131, 131-35 (1995).

² *New York v. EPA*, 443 F.3d 880 (D.C. Cir. 2006).

³ *Id.*, petition for cert. filed, 75 U.S.L.W. 3296 (U.S. Nov. 27, 2006) (No. 06-736), cert. denied, 127 S. Ct. 2127 (Apr. 30, 2007).

enforcement actions, thus giving it de facto effect.⁴ And, on September 14, 2006, the EPA proposed a further set of regulations, making it easier for plants to modernize without meeting the new source standards.⁵

In this Article, we present an economic analysis of the transition relief issue that the new regulations raise. We demonstrate that the new regulations are inefficient and would, contrary to the Administration's contention, worsen environmental quality. While certain transition relief may be appropriate in the context of environmental regulation, we argue that the relief should be limited in time. Moreover, because providing time-limited transition relief itself introduces the risk that recipients will seek to have that relief extended, we advocate that an appropriate system of time-limited relief should include disincentives to extensions.

The analysis here applies beyond the particular implications of the new regulatory revisions of grandfathering to new source review under the Clean Air Act generally. For example, in *United States v. Duke Energy Corp.*, the Fourth Circuit concluded that a plant modification allowing the plant to operate more hours per day, thereby increasing its total yearly emissions, did not trigger new source review provided its hourly emissions rate did not increase.⁶ The Fourth Circuit's decision was at odds with the holding of the District of Columbia Circuit in *New York v. EPA*,⁷ and the Supreme Court granted certiorari in the *Duke Energy* case to resolve the conflict.⁸ In the wake of the Court's grant of certiorari, the Seventh Circuit decided *United States v. Cinergy Corp.*,⁹ aligning itself with the District of Columbia Circuit. The Supreme Court recently sided with the District of Columbia and Seventh Circuits, rebuffing the Fourth Circuit's attempt to extend grandfathering judicially.¹⁰ But this outcome might be short-lived. On May 8, 2007, the EPA proposed a rule under which new source review for power plants would be triggered only if a plant increased both its hourly emissions rate and its total yearly emissions.¹¹

The policy questions these cases raise are analogous to those raised by the recent regulatory revisions. As Judge Richard A. Posner, writing for the court in *Cinergy Corp.*, observed, "Cinergy's interpretation would give the company an artificial incentive to renovate a plant and by so doing increase

⁴ See *infra* note 164.

⁵ See Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Debottlenecking, Aggregation, and Project Netting, 71 Fed. Reg. 54,235 (Sept. 14, 2006).

⁶ 411 F.3d 539 (4th Cir. 2005), *rev'd sub nom.* *Env'tl. Def. v. Duke Energy Corp.*, 127 S. Ct. 1423 (2007).

⁷ 413 F.3d 3, 19–20 (D.C. Cir. 2005).

⁸ 126 S. Ct. 2019 (2006).

⁹ 458 F.3d 705 (7th Cir. 2006), *cert. denied*, 127 S. Ct. 2034 (2007).

¹⁰ *Env'tl. Def.*, 127 S. Ct. 1423.

¹¹ Supplemental Notice of Proposed Rulemaking for Prevention of Significant Deterioration and Nonattainment New Source Review: Emissions Increases for Electric Generating Units, 72 Fed. Reg. 26,202 (May 8, 2007).

the plant's hours of operation, rather than to replace the plant."¹² In reversing the Fourth Circuit's decision, the Supreme Court removed that incentive and thus cabined somewhat the Clean Air Act's grandfathering. Despite the Court's holding, the Bush Administration has announced that it plans to continue revising the regulations so as to reduce the scope of new source review, thus further extending the Clean Air Act's grandfathering.¹³

Our analysis and argument here apply more broadly than to the case of air pollution regulation. The problem of whether and how to extend favorable treatment to existing sources is a recurring issue in environmental law. Our discussion applies wherever a new regulation precludes new entrants from engaging in a particular activity in which existing actors are already engaged. Thus, our analysis and argument also apply to the treatment of so-called "non-conforming uses"—land uses that predate zoning regulations that would now prohibit them—under zoning law.

This Article proceeds as follows. In Part I, we discuss the history of the Clean Air Act's differential regulation of new and modified sources. We focus on the circumstances under which existing sources that modernize their operations are required to meet the new source standards. Our detailed account highlights an important distinction. Until the beginning of the current administration, the EPA invoked its regulatory authority to define as consistently as possible the nature of the grandfathering prescribed by Congress in 1970 and 1977. In contrast, the EPA under the Bush Administration has significantly expanded the scope of the grandfathering.

In Part II, we examine the likely effects of the new regulations on new investment in plants and on air quality. We identify serious flaws in the Administration's argument that the expanded grandfathering will promote efficiency and modernization, and lead to better environmental quality. Both the theoretical analysis and the empirical evidence point in quite a different direction.

Part III considers the interactions between the new regulations and other regulatory standards under the Clean Air Act. We show that the laxer regulation of existing, dirty sources necessarily leads to more stringent regulation of new, cleaner sources, thereby increasing the overall cost of achieving a given level of environmental quality.

In Part IV, we analyze the expanded grandfathering of existing sources as a form of transition relief. The literature governing legal transitions suggests that transition relief is generally undesirable. The new regulations are unwarranted under this general presumption against transition relief. Moreover, to whatever extent transition relief may have been warranted under the original Clean Air Act, we argue that the new regulations exceed appropriate measures of transition relief.

¹² 458 F.3d at 709.

¹³ Steven D. Cook, *EPA to Proceed with Emissions Test Rule in Face of New Source Review Decision*, Daily Env't Rep. (BNA) No. 63, at A-2 (Apr. 2, 2007).

I. STATUTORY AND REGULATORY BACKGROUND

For more than three decades, the EPA sought to define a consistent understanding of the congressionally defined scope of grandfathering. Changes in administrations did not produce significant changes in policy. This approach came to an abrupt end in 2002, when the Bush Administration invoked its regulatory authority to significantly expand the scope of grandfathering, making it possible for existing sources to undertake considerable modernization without meeting the new source standards.

A. The 1970 and 1977 Amendments

The 1970 amendments to the Clean Air Act divide regulatory authority over stationary sources of pollution between state and federal governments. The federal government sets “standards of performance” for new stationary sources and modified existing sources; the state governments regulate existing, unmodified stationary sources.¹⁴ States must also ensure that the siting of new sources does not lead to a violation of the federally set national ambient air quality standards (NAAQS).¹⁵

Under the Clean Air Act, the EPA promulgates federal performance standards for stationary sources, “the construction or modification of which is commenced after the publication of regulations.”¹⁶ The Act defines “modification,” in turn, as “any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted.”¹⁷ Under a literal reading, any such change resulting in an increase in emissions, however miniscule, would qualify the change as a “modification” and thus trigger the application of new source performance standards.

Commentators regularly note that Congress expected most existing sources to gradually phase out over the course of their ordinary economic lives or to upgrade and trigger the new source performance standards, leaving most major stationary sources subject to federal control.¹⁸ Although the

¹⁴ See generally Clean Air Act Amendments of 1970 § 111, Pub. L. No. 91-604, 84 Stat. 1683 (1970). The Act in its current form is codified at 42 U.S.C. §§ 7410–7671q (2000).

¹⁵ Clean Air Act, 42 U.S.C. § 7410(a) (requiring states to provide for all control measures necessary to achieve NAAQS); *id.* § 7409(b) (defining primary NAAQS as standards “requisite to protect the public health” that incorporate “an adequate margin of safety,” and secondary NAAQS as “requisite to protect the public welfare”).

¹⁶ *Id.* § 7411(a)(2). Stationary source is defined as “any building structure, facility, or installation which emits or may emit any air pollutant.” *Id.* § 7411(a)(3).

¹⁷ *Id.* § 7411(a)(4).

¹⁸ *E.g.*, BRUCE BIEWALD, DAVID WHITE, TIM WOOLF, FRANK ACKERMAN & WILLIAM MOOMAW, GRANDFATHERING AND ENVIRONMENTAL COMPARABILITY: AN ECONOMIC ANALYSIS OF AIR EMISSION REGULATIONS AND ELECTRICITY MARKET DISTORTIONS 2 (1998), available at <http://www.synapse-energy.com/publications.htm> (“Participants in the original [c]ongressional debates, and official reports from the 1970s and 1980s, make it clear that lower overall emissions were expected

legislative history from 1970 does not make explicit the assumption that old sources would inevitably phase out or upgrade, the legislative history of the Clean Air Act's 1977 and 1990 amendments strongly suggests that Congress in 1970 expected grandfathering of these sources to be only temporary.¹⁹ In particular, legislators were aware that the expected useful economic life of power plants was thirty to forty years.²⁰

In 1977, Congress further entrenched the two-tiered approach to the regulation of new and existing sources through the passage of the Clean Air Act Amendments, which expanded the scope and stringency of the 1970 Act.²¹ The amendments established two programs, the Prevention of Sig-

to result from gradual phase-in of new plants and new energy technologies. Unfortunately, it turns out that many old plants are remaining in service far longer than expected, causing an indefinite delay in the anticipated emissions reductions from facility retirement.”); Shi-Ling Hsu, *Reducing Emissions from the Electricity Generation Industry: Can We Finally Do It?*, 14 TUL. ENVTL. L.J. 427, 435 (2001) (“[P]olicy has been developed with the assumption that thirty-year-old plants would be soon phased out of production.”); Deepa Varadarajan, Note, *Billboards and Big Utilities: Borrowing Land Use Concepts to Regulate “Nonconforming” Sources Under the Clean Air Act*, 112 YALE L.J. 2553, 2564 (2003) (“[L]egislators assumed that the natural turnover of power plants obviated the need for extensive old source regulation”); see also Larry Morandi, *Winds of Change: Controlling Emissions of Pollutants by Power Generators Can Be Done, But There’s Lots of Disagreement on the Best Way*, STATE LEGISLATURES, May 2003, at 26 (“Why the exemption for old facilities? The thinking at the time was that the older power plants would soon become obsolete and be replaced by newer, cleaner facilities.”). Generally, however, scholars cite one another for this proposition, rather than contemporaneous legislative documents. But see BIEWALD ET AL., *supra*, at 11 (“Thomas Jorling, Minority Counsel to the Public Works Committee that drafted the Clean Air Act, stated in interviews that the replacement of existing plants within normal operating lifetimes with newer ones that were subject to NSPS was implicit. David Hawkins, who was an influential attorney with the Natural Resources Defense Council who helped to shape the 1977 [Clean Air Act] Amendments[,] agreed that it was assumed that older plants would eventually be replaced.”).

¹⁹ Most of the expressly supportive legislative history is recent, as legislators proposing amendments to the Clean Air Act in the 1990s looked back to the Act’s passage. See, e.g., 136 CONG. REC. 36,007, 36,035 (1990) (Exhibit I submitted by George J. Mitchell) (“In 1970, the [Clean Air Act] required that new sources meet tight emissions standards. At that time, it was assumed that electrical utility units had an average lifetime of 30 years. But many utilities are now choosing to extend the life of their plants rather than meet the new source performance standards mandated under current law.”); *id.* at 6359, 6368 (1990) (statement of John H. Chafee) (“The rationale that is behind permitting these old plants to emit [at grandfathered emission capacity] is, first of all, they are inefficient, and at some point they are so inefficient they are going to be replaced.”). Legislative history regarding the New Source Review Program, established in 1977, contains an express reference to “[o]lder plants with relatively short-remaining useful lives.” H.R. REP. NO. 95-294, at 185–86 (1977). Note that a 1970 Senate Report contains a parallel but more circumscribed acknowledgement that at least some existing sources may have “short life expectancies.” S. REP. NO. 91-1196, at 19 (1970).

²⁰ See Hsu, *supra* note 18, at 435; Varadarajan, *supra* note 18, at 2564 (quoting Hsu). Legislators were at least aware of such turnover. In the context of waivers for existing stationary sources emitting hazardous pollutants, the 1970 Senate Report states that “[t]he Secretary would be authorized therefore to waive the application of standards established under this section to such stationary sources which have short life expectancies after requiring the application of the maximum technology which could be applied to such facilities.” S. REP. NO. 91-1196, at 19. Legislators thus expected at least some existing sources to “die out” naturally.

²¹ Pub. L. No. 95-95, 91 Stat. 685 (1977).

nificant Deterioration (PSD) and Nonattainment New Source Review (non-attainment), collectively called the New Source Review (NSR) program.²² The NSR program requires new or modified sources to obtain preconstruction permits from the EPA or from a qualified state agency. The NSR permit requirements vary by region: new facilities in areas that have not yet achieved the NAAQS must meet the nonattainment requirements, whereas new facilities in areas that have achieved the NAAQS (or for which there is insufficient air-quality data) must meet the PSD requirements.²³

Under the PSD program, new or modified sources in areas with better ambient air quality than the NAAQS must meet a performance standard at least as stringent as the new source performance standards (NSPS): the best available control technology (BACT).²⁴ The federal performance standards for PSD also apply only to new or modified sources, with “modified” defined in the same fashion as under NSPS.²⁵ Existing sources remain under state control, and regulation of such sources is federally required only to the extent that it is necessary for states to achieve their applicable ambient air quality standards.²⁶

For areas that have not yet attained the NAAQS, the 1977 Amendments impose a parallel, but more rigorous, preconstruction review process.²⁷ Under nonattainment review, new or modified sources—with “modified” having the same meaning as under NSPS—must meet a federal performance standard that is at least as stringent as any federal or state performance standard: the lowest achievable emission rate (LAER).²⁸ Additionally, to obtain permits, new or modified sources in a region must procure offsets from existing sources in that region to ensure that the region’s total emissions do not increase and that it can still achieve “reasonable further progress” toward the NAAQS.²⁹

²² See *New York v. EPA*, 413 F.3d 3, 12–13 (D.C. Cir. 2005).

²³ See generally 42 U.S.C. §§ 7501–15 (2000) (nonattainment); *id.* §§ 7470–92 (PSD).

²⁴ *Id.* § 7475(a)(4) (BACT).

²⁵ *Id.* § 7479(2)(C) (“modification” for PSD). Congress initially applied the PSD portion of the 1977 Amendments to new sources only, but quickly passed technical and conforming amendments to incorporate the NSPS definition of “modified” into the PSD program. Pub. L. No. 95-190, 91 Stat. 1393 (1977).

²⁶ For PSD, this standard is the allowable NAAQS increment and visibility standards where applicable. 42 U.S.C. § 7475; see also *id.* § 7410(a)(2)(D) (state implementation plans in NSR regions).

²⁷ See generally *id.* §§ 7501–15.

²⁸ *Id.* § 7503(a)(2) (LAER); *id.* § 7501(4) (“modification” for nonattainment). These three federal performance standards represent varying degrees of stringency: NSPS takes into account cost considerations and energy requirements, *id.* § 7411(a)(1); BACT reflects “energy, environmental, and economic impacts” and emissions achievable through alternative fuel techniques, and can never exceed the level of emissions allowable under NSPS, *id.* § 7479(3); LAER represents the “most stringent emission limitation” contained in a state implementation plan or achievable in practice, *id.* § 7501(3).

²⁹ *Id.* § 7503(a)(1)(A), (c)(1). Emissions increases must be offset by obtaining and registering emissions reductions.

With the exception of imposing some federal standards on old, unmodified sources in nonattainment areas,³⁰ the 1977 Amendments generally extended the old-new, state-federal regulatory divide that so defined the 1970 Act. Legislative history and scholarly commentary suggest that Congress continued to make this distinction, relying on its expectation that old plants would gradually be phased out and replaced by lower-emitting facilities.³¹

B. Early NSPS and PSD Regulation, 1970–1977

Regulators soon realized that the statutory definition of “modification” in section 111 was not self-evident. The EPA first proposed clarifying regulations in August 1971,³² and promulgated final rules in December of that year.³³ The rules defined “modification” in much the same way the statute did—as “any physical change in, or change in the method of operation of, an affected facility which increases the amount of any air pollutant . . . emitted by such facility or which results in the emission of any air pollutant . . . not previously emitted.” The rules provided that which changes qualified as “modifications” would be decided in case-by-case determinations made by the Administrator.³⁴ The rules exempted several key activities, however, from the definition of modification: routine maintenance, repair, and replacement; an increase in production rate, if the increase did not exceed the “operating design capacity of the affected

³⁰ Under the NSR program, old, unmodified sources in nonattainment areas must meet emissions limits based on “reasonably available control technology” (RACT), the least stringent performance standard in the Act. *Id.* § 7502(e)(1).

³¹ *See* H.R. REP. NO. 95-294, at 185–86 (1977) (discussing some employment and economic benefits of exempting “[o]lder plants with relatively short-remaining useful lives,” for example, that it would be more cost-effective and efficient for old plants to incorporate cleaner technologies when they upgrade, rather than forcing them to retrofit immediately). The emphasis that NSR places on proliferating cleaner technologies—on providing a guaranteed market for green vendors—supports the view that Congress assumed the gradual phaseout or modernization of old plants. *See* S. REP. NO. 95-127, at 31 (1977); *see also* NAT’L ACAD. OF PUB. ADMIN. (NAPA), A BREATH OF FRESH AIR: REVIVING THE NEW SOURCE REVIEW PROGRAM 14 (2003) [hereinafter NAPA] (“A vital aspect of this grandfather provision was the clear assumption of Congress that older, high-emitting sources would gradually be upgraded or phased out.”). The discussion in *supra* notes 18 and 19 is equally applicable to the 1977 Amendments since Congress incorporated the same core legislative scheme. Indeed, the case for assumed turnover is stronger in 1977 than in 1970 given that the 1977 Amendments were passed, in part, to correct the evident failings of the 1970 Act to improve the nation’s air quality and promote clean technologies. NAPA, *supra*, at 13. Gradual phaseout of old, high-emitting sources would seem essential to the successive cleaning of generations of sources and more rapid progress toward the NAAQS. *See id.* at 11–14.

³² *See generally* Standards of Performance for New Stationary Sources: Proposed Standards for Five Categories, 36 Fed. Reg. 15,704 (Aug. 17, 1971) (proposed rules).

³³ *See generally* Rules and Regulations, 36 Fed. Reg. 24,876 (Dec. 23, 1971) (final rules).

³⁴ Standards of Performance for New Stationary Sources: Proposed Standards for Five Categories, 36 Fed. Reg. at 15,705; Rules and Regulations, 36 Fed. Reg. at 24,877–78.

facility”; an increase in hours of operation; and use of alternative fuel or raw material if the affected facility could accommodate such use.³⁵

These exceptions are inconsistent with the clear language of section 111, under which any increase in emissions, no matter how miniscule, triggers new source requirements.³⁶ Nonetheless, the EPA viewed the routine maintenance exception as a “common-sense exclusion” from the statutory requirement; certainly the agency did not want to discourage basic maintenance.³⁷

Noting that confusion existed “as to what changes can be made to an existing source without the Administrator considering the source to have been modified,” the EPA proposed major changes to these regulations in October 1974,³⁸ and promulgated final rules in December 1975.³⁹ First, the rules distinguished the term “affected facility” from “stationary source” because the NSPS standards applied to individual processes and pieces of equipment rather than to entire sources.⁴⁰ Construction of a new “affected facility” at an existing source would not subject the entire source, only the new facility, to NSPS.

Second, the rules established the predecessor to the “bubble concept,” whereby new emissions that were offset by control technology at the same source would not trigger NSPS.⁴¹ Existing sources could qualify for a “bubble” exception if, in undergoing a physical or operational change, “the total emission[s] rate of any pollutant [did] not increase[] from all facilities within the stationary source,” for example, if the owner closed down another source within the plant.⁴² New construction, including new construction at existing sources, was ineligible for this “bubble” exception, however, because otherwise “large sources of air pollution could avoid the

³⁵ Rules and Regulations, 36 Fed. Reg. at 24,877.

³⁶ 42 U.S.C. § 7411(a)(4) (2000).

³⁷ The EPA described the routine maintenance exclusion as “common sense” in Requirements for Preparation, Adoption and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans; Standards of Performance for New Stationary Sources, 57 Fed. Reg. 32,314, 32,316 (July 21, 1992). Without the exclusion, the term “modification” could “encompass the most mundane activities at an industrial facility (even the repair or replacement of a single leaky pipe, or a change in the way the pipe is utilized).” *Id.*

³⁸ Standards of Performance for New Stationary Sources: Modification, Notification, and Reconstruction, 39 Fed. Reg. 36,946 (Oct. 15, 1974) (proposed rules).

³⁹ Modification, Notification, and Reconstruction, 40 Fed. Reg. 58,416 (Dec. 16, 1975) (final rules).

⁴⁰ 40 C.F.R. § 60.2(d)–(e), (aa) (1976).

⁴¹ The EPA later expanded this “bubble concept” to NSR and PSD programs. Requirements for Preparation, Adoption and Submittal of Implementation Plans and Approval and Promulgation of Implementation Plans, 46 Fed. Reg. 50,766 (Oct. 14, 1981). The “bubble concept” came to national prominence in *Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984) (upholding EPA’s plantwide definition of stationary source).

⁴² Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,419; 40 C.F.R. § 60.14(d).

application of new source performance standards indefinitely” by continually replacing outdated facilities.⁴³

Third, the rules defined an emissions increase as an increase in kilograms per hour. Thus, a source could increase its emissions by increasing its hours of operation without triggering the new source standards. The rules further provided two methods by which the Administrator could determine whether a physical or operational change resulted in an emissions increase: a factor-based test (with the factors being published from time to time by the EPA), or alternatively, a specific statistical method.⁴⁴

Fourth, the rules expanded the list of activities exempt from the definition of “modification.” While tracking (with slightly altered wording) the exceptions listed in 1971, the 1975 regulations also excluded the following activities: an increase in production rates at existing facilities if that increase could be accomplished without a capital expenditure; an addition of a system “whose primary function is the reduction of air pollutants”; and a relocation or change in ownership.⁴⁵

Finally, the rules declared that existing facilities undergoing reconstruction may become affected facilities—that is, trigger NSPS requirements—regardless of any change in emissions rates. The stated purpose of this rule was to “discourage the perpetuation of a facility, instead of replacing it at the end of its useful life with a newly constructed affected facility.”⁴⁶ The regulation set a very high bar, however, for what constituted “reconstruction”: only if the fixed capital cost of the new components exceeded fifty percent of the fixed capital cost required to construct an entirely new comparable facility, and even then only if it was technologically and economically feasible for the post-replacement facility to comply with the applicable standard of performance.⁴⁷ As with modification, the determination of reconstruction would be made by the Administrator on a case-by-case basis.⁴⁸

These 1975 rules represented the first detailed attempt to define “modification” for NSPS. Yet even on their face, these regulations remained unclear. Indeed, the basic articulation of “modification” varied, without explanation, in consecutive pages of the 1975 Federal Register detailing these rules: on one page, it was defined as a physical or operational change that increases the amount of air pollutant emitted, whereas on the next it

⁴³ Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,417.

⁴⁴ *Id.* at 58,416, 58,418–19; 40 C.F.R. § 60.14.

⁴⁵ Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,419–20; 40 C.F.R. § 60.14(e)(2). “Capital expenditure” was defined by reference to IRS rules. Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,416.

⁴⁶ Standards of Performance for New Stationary Sources: Modification, Notification, and Reconstruction, 39 Fed. Reg. 36,948 (Oct. 15, 1974).

⁴⁷ Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,420; 40 C.F.R. § 60.15. The “reconstruction” exception applies to PSD but not to NSR. 40 C.F.R. § 60.15.

⁴⁸ Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,420.

was defined as an increase in the emissions rate.⁴⁹ The EPA's regulations for PSD, issued the year before, compounded this confusion by defining "modification" as a physical or operational change increasing the emission rate of a pollutant and simultaneously declaring that the definition is meant "to be consistent with the definition used in [NSPS],"⁵⁰ which is phrased in terms of increases in total emissions.

C. The NSR Program and Its Regulatory Off-Shoots, 1977–2001

Since the passage of the NSR program in 1977, which incorporated the NSPS statutory definition of "modification,"⁵¹ the EPA has promulgated additional regulations and enforced the exceptions available to existing facilities undergoing physical or operational changes. Most of the relevant regulatory changes have occurred within the last ten years.

Pursuant to the 1977 Amendments, the EPA issued a new PSD rule in 1978 and a new nonattainment rule in 1979.⁵² In its PSD rule, the EPA defined "modification" as a physical or operational change that increased a source's "potential to emit"—the first appearance of that phrase in the Clean Air Act regulations.⁵³ In addition, the EPA limited preconstruction review only to those modifications deemed "major," which the EPA defined as changes increasing emissions rates by either 100 or 250 tons per year, depending on the category of stationary source.⁵⁴ As under NSPS, the EPA exempted "routine maintenance, repair, and replacement"⁵⁵ and allowed for "netting" to offset emissions increases.⁵⁶ The 1979 nonattainment rule largely paralleled this PSD rule.⁵⁷

Industry and environmental groups brought immediate challenges to the PSD rule. These challenges culminated in a lengthy District of Colum-

⁴⁹ Compare *id.* at 58,418 (amount of pollutant), and Rules and Regulations, 36 Fed. Reg. 24,877 (Dec. 23, 1971), with Modification, Notification, and Reconstruction, 40 Fed. Reg. at 58,419 (emissions rate). In a recent case, the D.C. Circuit characterized these 1975 regulations as confused. See *New York v. EPA*, 413 F.3d 3, 12 (D.C. Cir. 2005) ("[N]either the 1975 regulation nor its preamble explained why EPA found it necessary to offer these two separate glosses on 'modification.'").

⁵⁰ Prevention of Significant Air Quality Deterioration, 39 Fed. Reg. 42,510, 42,513–14 (Dec. 5, 1974).

⁵¹ 42 U.S.C. § 7501(4) (2000) ("modification" for NSR, tracking "modification" for NSPS, *id.* § 7411(a)(4)); 40 C.F.R. § 60.2.

⁵² Emission Offset Interpretative Ruling, 44 Fed. Reg. 3282 (Jan. 16, 1979); Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. 26,380, 26,388 (June 19, 1978).

⁵³ Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. at 26,380, 26,403–04.

⁵⁴ 40 C.F.R. §§ 51.24(b)(2), 52.21(b)(2) (1978).

⁵⁵ The EPA first promulgated the "routine maintenance" exception for NSPS in 1975, Modification, Notification, and Reconstruction, 40 Fed. Reg. 58,416 (Dec. 16, 1975), and for NSR in 1978, Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. at 26,380, 26,388. See 40 C.F.R. § 52.21(b)(2)(iii) (PSD); *id.* § 52.24(f)(5) (nonattainment).

⁵⁶ Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. at 26,388.

⁵⁷ Emission Offset Interpretative Ruling, 44 Fed. Reg. at 3282.

bia Circuit opinion, *Alabama Power Co. v. Costle*.⁵⁸ While the case concerned PSD, many of its holdings were equally applicable to nonattainment, given the regulatory overlap. The court in *Alabama Power* upheld many key provisions of PSD, including the bubble provisions.⁵⁹ The court, however, invalidated the EPA's limiting of major "modification" to only those sources emitting 100 or 250 tons per year on the grounds that the statutory definition of modification is "nowhere limited to physical changes exceeding a certain magnitude." Any such limit, the court concluded, would contravene congressional intent to make grandfathering of old sources only temporary by giving old sources "a perpetual immunity" from PSD.⁶⁰ While invalidating the EPA's threshold limit of modification, the court found that the EPA did have discretion to exempt activities "on grounds of de minimis or administrative necessity."⁶¹ Finally, the court ruled that "potential to emit" could not mean uncontrolled emissions if pollution controls are installed and operative; the calculation had to include reductions attributable to pollution control technology.⁶² The court thus placed clear limits on the permissible scope of grandfathering.

After the *Alabama Power* decision, the EPA issued revised PSD and nonattainment rules—final NSR rules that remained in effect for over twenty years despite many court challenges and proposed revisions. In these 1980 rules, the EPA retained the phrase "major modification" from its 1978 rule, but defined "major" as any physical or operational change "that would result in a significant net emissions increase," taking into account contemporaneous offsets.⁶³ The EPA further decided that in determining whether a source has undergone a "modification," the source's "potential to emit" should be determined by reference to applicable pollution controls and any federally enforceable limits on hours, materials, and production.⁶⁴ As under NSPS, the NSR rules exempted an increase in hours of operation or in production rates from the definition of physical or operational change.⁶⁵

⁵⁸ 636 F.2d 323 (D.C. Cir. 1979).

⁵⁹ *Id.* at 401–03. The court differentiated its upholding of the PSD "bubble" rule from an earlier D.C. Circuit ruling that invalidated the NSPS "bubble" rule, *ASARCO Inc. v. EPA*, 578 F.2d 319 (D.C. Cir. 1978). One significant difference between the two programs was the definition of "source": The NSPS rule allowed offsets from "any combination of facilities"—a "defect on which the ASARCO decision turned"—whereas the PSD rule did not. *Ala. Power*, 636 F.2d at 402.

⁶⁰ *Id.* at 400.

⁶¹ *Id.* The court made clear, however, that the EPA's discretion in this regard did not extend to exempting as de minimis all physical changes falling below a particular threshold. *See id.*

⁶² *Id.* at 353.

⁶³ Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, 45 Fed. Reg. 52,676, 52,735 (Aug. 7, 1980).

⁶⁴ *Id.*

⁶⁵ *Id.* at 52,735–36.

Finally, the EPA retained the routine maintenance exclusion, an exclusion that had appeared in every iteration of the NSPS and NSR rules to date.⁶⁶ Given the importance that the concept subsequently acquired, there was surprisingly little discussion about the routine maintenance exception in those early years.⁶⁷ Even after the *Alabama Power* court ruled that the EPA could limit the definition of modification only on grounds of de minimis increases or administrative necessity, the routine maintenance exclusion generated little comment. Indeed, the final NSR rules in 1980 adopted the routine maintenance exclusion exactly as proposed, without discussion, because the EPA received no significant comments on the proposal during the notice-and-comment period.⁶⁸ Thus, in the final rules, the EPA did not elaborate on the term; the regulations did not explicitly define what activities would be deemed routine or minor and therefore avoid NSR requirements.⁶⁹ Instead, not long after the establishment of the NSR program, the EPA began to make case-by-case determinations of whether changes mandated NSR review.⁷⁰ The agency typically weighed multiple factors, such as the “nature, extent, purpose, frequency, and cost of the work,” to arrive “at a common-sense finding” about the appropriateness of applying NSR.⁷¹

This ad hoc method of applying NSR to repair or facility maintenance projects frustrated both industry representatives and regulators, as did the EPA’s lack of clear definitions and standards for all issues involving major versus minor modifications.⁷² In response to these complaints, the EPA began an NSR reform effort in August 1992 by creating an advisory committee, comprised of representatives from the EPA, state environmental

⁶⁶ Emission Offset Interpretative Ruling, 44 Fed. Reg. 3282 (Jan. 16, 1979) (nonattainment); Prevention of Significant Air Quality Deterioration, 43 Fed. Reg. 26,388 (June 19, 1978) (PSD); Modification, Notification, and Reconstruction, 40 Fed. Reg. 58,416 (Dec. 16, 1975) (NSPS); Approval and Promulgation of Implementation Plans, Prevention of Significant Air Quality Deterioration, 39 Fed. Reg. 42,510 (Dec. 5, 1974) (PSD); Standards of Performance for New Stationary Sources, 36 Fed. Reg. 24,876 (Dec. 23, 1971) (NSPS).

⁶⁷ See NAPA, *supra* note 31, at 40.

⁶⁸ *Id.* at 39.

⁶⁹ Matthew C. Stephenson, *A Tale of Two Theories: The Legal Basis for EPA’s Proposed Revision to the Routine Maintenance, Repair, and Replacement Exception, and the Implications for Administrative Law*, 33 ENVTL. L. REP. 10,789, 10,789 (2003) (“[T]he scope of the [routine maintenance] exception is relatively narrow, its form is that of an open-ended, multi-factor standard, and its legal justification is not entirely clear . . .”).

⁷⁰ *Wis. Elec. Power Co. v. Reilly (WEPCO)*, 893 F.2d 901, 910 (7th Cir. 1990) (quoting Memorandum from Don R. Clay, Acting Assistant Adm’r for Air and Radiation, U.S. EPA, to David A. Kee, Dir. of Air and Radiation Div., U.S. EPA Region V (Sept. 9, 1988)); Varadarajan, *supra* note 18, at 2560–61.

⁷¹ *WEPCO*, 893 F.2d at 910 (quoting Memorandum from Don R. Clay, Acting Assistant Adm’r for Air and Radiation, U.S. EPA, to David A. Kee, Dir. of Air and Radiation Div., U.S. EPA Region V (Sept. 9, 1988)).

⁷² See, e.g., Christopher W. Armstrong, *EPA’s New Source Review Enforcement Initiatives*, 14 NAT. RESOURCES & ENV’T 203, 203 (2000); Lisa A. Binder, *Making Sense of the EPA’s Reactivation Policy: An Industrial Plant that Shuts Down Temporarily May Be Considered New When It Reopens*, L.A. LAW, June 2002, at 11.

regulators, environmental groups, and industry representatives.⁷³ From 1993 to 1996, the EPA held various “NSR simplification workshops,” initiated pilot programs, and received numerous comments from interested parties.⁷⁴ A 1994 draft reform defined routine maintenance as “minor maintenance or repair of parts or components and the replacement of minor parts or components with identical or functionally equivalent items.”⁷⁵ Industry, however, strongly opposed this proposed definition as being too limiting and discouraging “routine” change. In 1996, the EPA formulated an NSR simplification, proposing a revised determination of baseline emissions (actual and projected emissions), exclusions for “clean units”⁷⁶ and “pollution control projects” (PCPs),⁷⁷ and other changes to NSR applicability determinations.⁷⁸ This proposed rule, which did not seek to clarify the meaning of the “routine maintenance” exception, was stalled for years.

In 1998, the agency renewed its reform efforts by again soliciting comments on its proposed reforms.⁷⁹ Over the next two years, House and Senate members introduced reformed NSR standards, which subsequently failed in the face of industry opposition.⁸⁰ After collecting and preparing responses to numerous comments, the EPA rewrote the entire NSR reform

⁷³ David A. Golden, *The Need to Reform NSR Reform*, 12 NAT. RESOURCES & ENV'T 170, 171 (1998).

⁷⁴ *Id.*

⁷⁵ NAPA, *supra* note 31, at 40 (quoting EPA, New Source Review Reform 106–09 (1994) (preliminary staff draft)).

⁷⁶ The EPA explained:

In general, [the] new “clean unit” exclusion will allow States to exclude from major NSR[] proposed changes to existing emissions units that have installed major BACT or LAER within the last 10 years Under this exclusion, sources can make any change to a qualifying unit so long as the change will not increase the unit’s emissions rate (measured in terms of the unit’s maximum hourly emissions . . .). Specifically, changes which do not increase the unit’s hourly potential emissions would not be considered [] physical or operational change[s] and thus would not trigger major NSR.

Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR), 61 Fed. Reg. 38,250, 38,255 (July 23, 1996). *See generally id.* at 38,255–58.

⁷⁷ The EPA explained:

The EPA proposes to adopt for all source categories a pollution control project exclusion from the definition of “physical or operational change” within the definition of major modification. This proposed exclusion will shield these projects from being considered “major modifications” and subject to major NSR. As proposed, the exclusion encompasses add-on controls, switches to less polluting fuels and pollution prevention projects[,] and is subject to one overarching safeguard[,] first applied in *WEPCO*: that the proposed pollution control project cannot result in an emissions increase that will cause or contribute to a violation of a NAAQS or PSD increment . . . [F]or pollution prevention projects, the permitting authority must find that the project is environmentally beneficial before such projects may qualify as [] pollution control project[s].

Id. at 38,261 (citations omitted). *See generally id.* at 38,260–63.

⁷⁸ *See generally id.* at 38,250.

⁷⁹ Notice of Availability, Alternatives for New Source Review (NSR) Applicability for Major Modifications, 63 Fed. Reg. 39,857, 39,857 (July 24, 1998).

⁸⁰ Hsu, *supra* note 18, at 436 & n.50 (referring to S. 2636, introduced in October 1998 by Sen. Leahy (D-VT); H.R. 2980, introduced in October 1999 by Rep. Allen (D-ME); and S. 2610, introduced in October 1998 by Sen. Lieberman; Varadarajan, *supra* note 18, at 2554.

proposal and presented it to stakeholders in February 1999.⁸¹ Failing to develop a consensus, however, the EPA again solicited comments from stakeholders on potential NSR modifications that included an “opt-out” of NSR for the power-generating industry.⁸² But by May 2001, these reform efforts—lasting almost a decade—had not yet come to fruition.

Despite these failed reform efforts and ad hoc definitions of “major modification,” the EPA did not shy away from NSR enforcement cases. Large-scale and coordinated enforcement actions began in earnest in the late 1980s; the EPA brought actions against the wood products industry for their suspected failures to comply with NSR requirements after making significant changes in their operations.⁸³ Throughout the 1990s, the EPA launched vigorous and successful enforcement initiatives against coal-fired power plants, petroleum refineries, chemical manufacturers, the pulp and paper industry, and the utility industry.⁸⁴

One of the EPA’s early proceedings in the late 1980s culminated in a court decision that remains to date the most extensive judicial articulation of “major modification” for NSR: *Wisconsin Electric Power Company v. Reilly (WEPCO)*, in which Wisconsin Electric Power Company challenged the EPA’s determination that it had undertaken a “major modification” without NSR approval.⁸⁵ WEPCO claimed its renovations, including large-scale replacement of steel drums and air heaters, were exempt from NSR because they fit under the “routine maintenance, repair, and replacement” umbrella of activities.⁸⁶ The EPA countered that the project was too costly and extensive—an unprecedented “life extension” project—to qualify for the routine maintenance exemption.⁸⁷ The Seventh Circuit ultimately upheld the legitimacy of the EPA’s narrow interpretation of “routine maintenance,” under which the EPA principally weighed four factors—the nature and extent, purpose, frequency, and cost of the project—to determine eligi-

⁸¹ Announcement of Public Meeting, New Source Review (NSR), 64 Fed. Reg. 3890, 3890 (Jan. 26, 1999).

⁸² Michael Settineri, *Reforming the New Source Review Program*, 13 FORDHAM ENVTL. L.J. 107, 111–12 (2001); see also Letter from John S. Seitz, Dir., Office of Air Quality Planning and Standards, to Participants (Dec. 20, 1999), available at <http://www.epa.gov/ttn/nsr/gen/invite1.pdf>.

⁸³ See Thaddeus R. Lightfoot, *Sand Through the Hourglass: PSD Enforcement and the Statute of Limitations*, 32 ENVTL. L. REP. 11,342, 11,342 (2002).

⁸⁴ NAPA, *supra* note 31, at 42–43.

⁸⁵ 893 F.2d 901, 904 (7th Cir. 1990); see also NAPA, *supra* note 31, at 42.

⁸⁶ *WEPCO*, 893 F.2d at 908.

⁸⁷ *Id.* at 908–09, 911–12. The project cost at least \$70.5 million, had never before occurred at the facility, and was of the sort that “would normally occur only once or twice during a unit’s expected life cycle.” *Id.* at 911–12; see also Inho Choi, *Is the U.S. Environmental Protection Agency’s Revised New Source Review Rule Moving in the Right Direction?: A Deepened New Source Bias, and the Need for Pursuing Sustainable Energy Development in Air Pollution Control Law*, 35 ENVTL. L. REP. 10,316, 10,321 (2005).

bility for the exception on a case-by-case basis.⁸⁸ The court reasoned that any broader definition—one that would include costly and sizeable “life-extension” projects—would “open vistas of indefinite immunity from the provisions of NSPS and PSD” for existing plants and “might upset the economic-environmental balance [of the Clean Air Act] in unintended ways.”⁸⁹ This decision bolstered the EPA’s enforcement efforts against industries undergoing “major modifications” without obtaining NSR preconstruction permits.⁹⁰

After the EPA’s early successes in proceedings against WEPCO and the wood products industry,⁹¹ the EPA began evaluating entire industry sectors and issuing “Sector Notebooks” to provide officials with comprehensive environmental profiles of industrial operations and emissions.⁹² Armed with this new information, in 1997 the agency began a three-pronged attack on the pulp and paper industry, the petroleum refining industry, and the electric utility industry.⁹³ Data collected on these industries indicated that numerous facilities had probably been making major modifications to increase production without first undergoing NSR review; local and state en-

⁸⁸ *WEPCO*, 893 F.2d at 910, 913; see *United States v. Duke Energy Corp.*, 278 F. Supp. 2d 619, 638 (M.D.N.C. 2003) (identifying the “*WEPCO* factors” as “nature and extent, purpose, frequency, and cost”), *aff’d on other grounds*, 411 F.3d 539 (4th Cir. 2005), *rev’d sub nom.* *Env’tl. Def. v. Duke Energy Corp.*, 127 S. Ct. 1423 (2007); *United States v. Ohio Edison Co.*, 276 F. Supp. 2d 829, 852–53 (S.D. Ohio 2003) (same); *United States v. So. Ind. Gas & Elec. Co.*, 245 F. Supp. 2d 994, 1015 (S.D. Ind. 2003) (highlighting the *WEPCO* factors of “the cost, magnitude, nature, and frequency of the proposed repairs and renovations”). *But cf.* *United States v. Ala. Power Co.*, 372 F. Supp. 2d 1283, 1290 (N.D. Ala. 2005) (identifying the four *WEPCO* factors as “the nature, extent, purpose, and frequency of the work”).

⁸⁹ *WEPCO*, 893 F.2d at 909. The *WEPCO* case also addressed the EPA’s determination of whether a plant’s potential or projected emissions levels should be used to decide whether a physical or operational change produces significant increases in net emissions and therefore triggers NSR. Whereas actual-to-potential estimates assume maximum or continuous operation of the plant except as limited by permit, actual-to-projected-actual estimates assume ordinary operation—that the plant will operate at “present hours and conditions.” *Id.* at 918 n.14. The *WEPCO* court rejected the EPA’s actual-to-potential test in favor of an actual-to-projected-actual test for “like-kind equipment replacements” of the sort that WEPCO had performed. The EPA formalized the court’s ruling in its 1992 rulemaking by allowing electric utility steam generating units to employ this actual-to-projected-actual test. 40 C.F.R. § 51.165 (1992). See also *NAPA*, *supra* note 31, at 38.

⁹⁰ David B. Spence, *Coal-Fired Power in a Restructured Electricity Market*, 15 DUKE ENVTL. L. & POL’Y F. 187, 204–05 (2005) (discussing increased new source review enforcement in the Clinton administration).

⁹¹ See, e.g., *United States v. La.-Pac. Corp.*, 682 F. Supp. 1141, 1162–63 (D. Colo. 1988) (holding that defendant corporation should have obtained PSD permits before constructing two new wood products plants).

⁹² *NAPA*, *supra* note 31, at 42.

⁹³ *Armstrong*, *supra* note 72, at 203–04.

vironmental agencies had received surprisingly few NSR applications despite industry growth and surges in production.⁹⁴

This initiative employed a narrow interpretation of the term “major modification,” as delineated in part in the EPA’s 1998 NSR guidance.⁹⁵ The EPA applied the four-factor WEPCO test strictly to find that many industry projects labeled as “routine maintenance” were far from routine; they were often too extensive, too costly (and charged as capital expenditures, not as part of the maintenance budget), and too infrequently performed at the specific unit to qualify for the exclusion.⁹⁶ Many such projects were large-scale “life-extension” projects similar to WEPCO’s project; others were de novo construction of entire units; still others were “reliability projects,” which the EPA treated as “major modifications” even if the emis-

⁹⁴ *Id.* at 204. See U.S. GEN. ACCOUNTING OFFICE (GAO), CLEAN AIR ACT: NEW SOURCE REVIEW REVISIONS COULD AFFECT UTILITY ENFORCEMENT CASES AND PUBLIC ACCESS TO EMISSIONS DATA 10 (2003) [hereinafter GAO REPORT, UTILITY ENFORCEMENT]; NAPA, *supra* note 31, at 42.

⁹⁵ Memorandum from Eric V. Schaeffer, Dir., Office of Regulatory Enforcement, Guidance on Appropriate Injunctive Relief for Violations of Major Source Review Requirements, at 5–6 (Nov. 17, 1998), available at <http://www.epa.gov/Region7/programs/artd/air/nsr/nsrmemos/nsrguida.pdf>; see also Choi, *supra* note 87, at 10,326. The memorandum listed two situations in which NSR requirements were triggered, both involving potential emissions in excess of major source threshold or permit levels. See Memorandum from Eric V. Schaeffer, *supra*, at 3.

⁹⁶ See David M. Friedland & Laura K. McAfee, *U.S. v. Ohio Edison and U.S. v. Duke Energy: Conflicting Interpretations of “Routine Repair”* Defense 4–6 (Sept. 5, 2003), <http://www.bdlaw.com/assets/attachments/73.pdf>; NAPA, *supra* note 31, at 43. In addition to narrowing the “routine maintenance” exemption, the EPA also seemed to be narrowing the alternative fuels exemption. See Armstrong, *supra* note 72, at 204. Regarding the cost factor of the “routine maintenance” analysis, the EPA typically examines the relative costs of improvements, not the absolute costs. Friedland & McAfee, *supra*, at 6. Other factors the EPA considers include whether the work is performed by outside contractors or by in-house maintenance staff and whether the expenses are charged as capital expenses or as part of the operation and maintenance budget. *United States v. Ohio Edison*, 276 F. Supp. 2d 829, 858–59 (S.D. Ohio 2003); Friedland & McAfee, *supra*, at 5. The scope of the “frequency” factor—whether “routine” should be defined relative to the particular unit or to all sources within the relevant industry—is under debate. Compare Requirements for Preparation, Adoption and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans; Standards of Performance for New Stationary Sources, 57 Fed. Reg. 32,314, 32,326 (July 21, 1992) (the WEPCO rule, seemingly favoring industry-wide approach for electrical steam generating units), and *United States v. Duke Energy Corp.*, 278 F. Supp. 2d 619, 630 n.8 (M.D.N.C. 2003) (rejecting the EPA’s unit-specific approach as inconsistent with congressional intent and prior EPA interpretations), *aff’d*, 411 F.3d 539 (4th Cir. 2005), *rev’d*, 127 S. Ct. 1423 (2007), with *Ohio Edison*, 276 F. Supp. 2d at 861 (upholding the EPA’s unit-specific approach), and *United States v. So. Ind. Gas & Elec. Co. (SIGECO)*, 245 F. Supp. 2d 994, 1007–10 (S.D. Ind. 2003) (same), and FRANCIS X. LYONS, REG’L ADMIN., EPA, DETROIT EDISON APPLICABILITY DETERMINATION DETAILED ANALYSIS 2 (May 23, 2000), available at <http://www.epa.gov/region07/programs/artd/air/nsr/nsrmemos/detedisn.pdf> (defining “routine” relative to the particular unit), and *In re Tenn. Valley Auth.*, 9 E.A.D. 357, 393–94 (U.S. EPA Envtl. App. Bd. Sept 15, 2000), available at <http://www.epa.gov/eab/disk11/tva.pdf> (adopting unit-specific definition of “routine,” though this decision was later voided by the Eleventh Circuit for lack of jurisdiction, *Tenn. Valley Auth. v. Whitman*, 336 F.3d 1236, 1239 (11th Cir. 2003)).

sions increase was caused by increasing hours of operation rather than by increasing emissions rates.⁹⁷

In summary, frustrated by its own inability to produce the much-sought-after NSR reform through notice-and-comment rulemaking, the agency clarified the meaning of “major modification” through the exercise of its enforcement authority.⁹⁸ The initiative was successful for the EPA because it led to “unprecedented settlements in terms of scope and penalties.”⁹⁹ The EPA secured large settlements from a number of different industries, beginning with over \$15 million in civil penalties and over \$90 million in pollution-control installation costs from Georgia-Pacific and Louisiana-Pacific for violations by their pulp and paper production facilities.¹⁰⁰ Between 2000 and 2001, the EPA reached settlements with four petroleum companies involving twenty-seven refineries.¹⁰¹ One settlement in 2004 cost the settling refinery an estimated \$323 million in installation and mitigation costs and civil penalties.¹⁰² Within the power-generating utility industry, the EPA reached a number of sizeable settlements after the federal government commenced actions against nine electric utility companies in

⁹⁷ See EPA, NSR 90-DAY REVIEW BACKGROUND PAPER 10 (June 22, 2001) [hereinafter EPA, 90-DAY REVIEW], available at <http://www.epa.gov/nsr/documents/nsr-review.pdf>; Friedland & McAfee, *supra* note 96, at 6. For more on reliability projects, see Makram B. Jaber, *Utility Settlements in New Source Review Lawsuits*, 18 NAT. RESOURCES & ENV'T 22, 23–24 (2004); EPA, NEW SOURCE REVIEW: REPORT TO THE PRESIDENT 10 (June 2002), available at http://www.epa.gov/nsr/documents/nsr_report_to_president.pdf [hereinafter EPA, NEW SOURCE REVIEW REPORT]. Note, however, that a district court in Indiana recently struck down the EPA's characterization of increases in actual emissions from averted shutdowns as a “significant net emissions increase” for purposes of NSR. *SIGECO*, 245 F. Supp. 2d at 1020.

⁹⁸ Armstrong, *supra* note 72, at 205 (“The NSR enforcement initiative has taken on the look of a surrogate for those regulatory initiatives that have stalled and may ultimately fail.”); Kevin A. Gaynor & Benjamin S. Lippard, *Environmental Enforcement: Industry Should Not be Complacent*, 32 ENVTL. L. REP. 10,488, 10,488 (2002) (“It is a fair statement that under EPA's legal theories, every utility in the country has been violating the new source review requirements since their inception in 1978.”); Varadarajan, *supra* note 18, at 2581.

⁹⁹ Rolf R. von Oppenfeld et al., *A Primer on New Source Review and Strategies for Success*, 32 ENVTL. L. REP. 11,091, 11,108 (2002).

¹⁰⁰ See Armstrong, *supra* note 72, at 203 (noting that the EPA fined Georgia-Pacific \$4.5 million and Louisiana-Pacific \$11 million, for a total of \$15 million in penalties); NAPA, *supra* note 31, at 170–71, 179 (noting that in 1993, Louisiana-Pacific agreed to pay \$11 million in civil penalties and install \$70 million in new pollution control equipment; in 1996, Georgia-Pacific agreed to pay \$6 million in penalties and install \$25 million in control equipment; and in 2000 and 2002, the EPA settled with two other wood products companies, Wilamette and Boise Cascade, for a total of approximately \$15 million in civil penalties and \$99 million in control costs).

¹⁰¹ The four companies are Koch, BP-Amoco, Motiva/Equilon/Shell, and Marathon Ashland Petroleum. EPA, 90-DAY REVIEW, *supra* note 97, at 30. For details on the civil penalties and control costs imposed, see NAPA, *supra* note 31, at 179.

¹⁰² This settlement was with Citgo Petroleum. See Choi, *supra* note 87, at 10,327 n.103.

November 1999.¹⁰³ The EPA already reached final agreements with six utility companies and “agreements in principle” with two others.¹⁰⁴

The targeted industries viewed the EPA’s actions “as a frontal assault on selected utilities in order to advance a radical and retroactive interpretation of the New Source Review (NSR) program of the Clean Air Act.”¹⁰⁵ In 2002, however, the Bush Administration’s Department of Justice published an NSR report characterizing the EPA’s enforcement initiative, in particular

¹⁰³ E. Donald Elliott et al., *Recent Clean Air Act Development*, SH058 A.L.I.-A.B.A. 1, 4–5 (2003); Choi, *supra* note 87, at 10,321.

¹⁰⁴ The EPA reached final settlements with Tampa Electric in 2000 (\$3.5 million in civil penalties and \$85 million in control costs); PSEG Fossil LLC in 2002 (\$1.4 million in penalties and an estimated \$337 million in installation costs); and Alcoa, Dominion Energy, WEPCO, and SIGECO in 2003; the EPA reached “agreements in principle” with Cinergy, Inc. and Virginia Power. NAPA, *supra* note 31, at 43, 179; Elliott et al., *supra* note 103, at 5, 10; Jaber, *supra* note 97, at 25. Regarding SIGECO, a district court ruled on a preliminary motion that the EPA’s enforcement action was not barred by virtue of the state agency’s prior approval of the challenged plant modifications as “routine maintenance.” *United States v. So. Ind. Gas & Elec. Co.*, No. IP99-1692-CM/F, 2002 WL 1760699, at *4–5 (S.D. Ind. July 26, 2002) (holding that section 113 of Clean Air Act authorizes the EPA to bring an action for any violation of an applicable performance standard, and that the EPA would only be barred by state authorization of industry conduct if the EPA “knew the facts” of the state agency’s ruling and engaged in “affirmative misconduct”); *see* Choi, *supra* note 87, at 10,321; Elliott et al., *supra* note 103, at 5.

The ninth electrical utility targeted in 1999 was the Tennessee Valley Authority (TVA). Instead of bringing a federal lawsuit against the TVA, the EPA filed an administrative compliance order. The Eleventh Circuit, however, has since voided the order on the ground that the EPA’s Environmental Appeals Board (EAB) lacked jurisdiction, leaving the TVA free to ignore the provisions of the administrative compliance order without risking additional penalties. *Tenn. Valley Auth. v. Whitman*, 336 F.3d 1236, 1260 (11th Cir. 2003) (holding that the EAB lacked jurisdiction because the EPA had not first taken the TVA to the district court to allege violations before filing an administrative order); *see also* Molly McDonough, *EPA Enforcement Tool Struck Down: Appeals Court Says Right to Due Process Requires Court Proceedings*, 2 A.B.A. J. E-REP. 2 (July 11, 2003).

In August 2003, district courts reached conflicting decisions in two of the active lawsuits against utility industries. The Southern District of Ohio upheld the EPA’s interpretation of the “major modification” provision under NSR on the ground that it is based on clear and unambiguous guidance from the Clean Air Act. *United States v. Ohio Edison Co.*, 276 F. Supp. 2d 829, 889 (S.D. Ohio 2003). *See also* Friedland & McAfee, *supra* note 96, at 1–2. Only a few weeks later, however, the Middle District of North Carolina reached the opposite conclusion in a very similar case on the ground that the EPA’s standard for “routine maintenance” was too strict, violating congressional intent and impermissibly deviating from previous agency policy. *United States v. Duke Energy Corp.*, 278 F. Supp. 2d 619, 637 (M.D.N.C. 2003), *aff’d*, 411 F.3d 539 (4th Cir. 2005), *rev’d*, 127 S. Ct. 1423 (2007).

¹⁰⁵ Elliot Eder & Robin L. Juni, *Has EPA Fired Up Utilities to Clear the Air?*, 15 NAT. RESOURCES & ENV’T. 8, 8–9 (2002) (“In industry’s view, [the] EPA is suddenly reinterpreting its regulations through selective enforcement but is not using the rulemaking process to place all coal-fired power generators in a uniform position. Thus targeted utilities (and their host state regulators) face tremendous uncertainty as to what constitutes compliance with preconstruction permit requirements for all sorts of . . . projects.”); *see also* ELEC. RELIABILITY COORDINATING COUNCIL, ERCC WHITE PAPER ON NEW SOURCE REVIEW 1 (2002), available at <http://electricreliability.org/vc.php?cid=163> (“EPA’s NSR rules, which for thirty years have been consistently applied . . . are now being reinterpreted without any rulemaking change . . . , causing major disruption in routine maintenance schedules, curtailing power output, and dismembering whole Titles of the Clean Air Act.”).

its interpretation of the routine maintenance exception, as legally sound and “reasonable” in light of the CAA and its implementing regulations.¹⁰⁶

D. Recent Regulation, 2001–Present

In May 2001—with the NSR reform attempts having lasted almost a decade, yet still incomplete—the Vice President’s National Energy Policy Development Group issued its proposed national energy policy.¹⁰⁷ This proposal included a recommendation that the EPA report to the President on the NSR and NSPS programs’ effects on investment, energy efficiency, and pollution reduction.¹⁰⁸ In response, the EPA released an “NSR 90-Day Background Paper” in June 2001 and solicited public input.¹⁰⁹

A year later, the EPA released its final report, “New Source Review: Report to the President.” The Report summarized the information the EPA received from the public and concluded that while NSR did not significantly hinder investment in new power plants and industrial facilities,¹¹⁰ it did discourage energy efficiency projects at already-existing facilities.¹¹¹ The EPA recommended adding “clarity and certainty” to the scope of the routine maintenance exclusion so as to “reduc[e] the unintended consequences of discouraging worthwhile projects that are in fact outside the

¹⁰⁶ OFFICE OF LEGAL POLICY, U.S. DEP’T OF JUSTICE, NEW SOURCE REVIEW: AN ANALYSIS OF THE CONSISTENCY OF ENFORCEMENT ACTIONS WITH THE CLEAN AIR ACT AND IMPLEMENTING REGULATIONS 40 (2002), available at <http://purl.access.gpo.gov/GPO/LPS18007>; see also Choi, *supra* note 87, at 10,327.

¹⁰⁷ NAT’L ENERGY POLICY DEV. GROUP, NATIONAL ENERGY POLICY REPORT: RELIABLE, AFFORDABLE, AND ENVIRONMENTALLY SOUND ENERGY FOR AMERICA’S FUTURE (2001).

¹⁰⁸ *Id.* at 7–14; GAO REPORT, UTILITY ENFORCEMENT, *supra* note 94, at 12.

¹⁰⁹ EPA, 90-DAY REVIEW, *supra* note 97. The EPA followed through by holding four public hearings, hosting individual meetings, and reviewing over 130,000 comments from private citizens, environmental groups, state officials, and industry representatives. EPA, NEW SOURCE REVIEW REPORT, *supra* note 97, at 2–3.

¹¹⁰ EPA, NEW SOURCE REVIEW REPORT, *supra* note 97, at 5–8 (“[A]s a general matter, available information indicates that NSR typically does not represent a significant barrier to the construction of new electricity plants [or of new refinery plants].”). The EPA cited substantial investment in new plants and refineries as evidence that NSR does not obstruct investment. The recent decline in investment in new greenfield refineries is not attributable to NSR, the EPA concluded, but rather to economic and environmental restrictions wholly unrelated to NSR. *Id.* at 1, 6, 8.

¹¹¹ *Id.* at 14–17. The EPA based its conclusions solely on the large volume of anecdotal evidence it received from industry sources, *id.* at 11, because the agency had no comprehensive data on projects that failed to go through on account of NSR. See U.S. GEN. ACCOUNTING OFFICE (GAO), RPT. NO. GAO-03-947, CLEAN AIR ACT: EPA SHOULD USE AVAILABLE DATA TO MONITOR THE EFFECTS OF ITS REVISIONS TO THE NEW SOURCE REVIEW PROGRAM 4 (2003) [hereinafter GAO REPORT, DATA]. For more background on these investment conclusions, see EPA, 90-DAY REVIEW, *supra* note 97, at 18 (discussing the difference between retrofitting old plants, which can be technically problematic and expensive, and incorporating new pollution technology into new plants, an easier and cheaper process occurring during the design phase). In this 90-Day Review Report, the EPA suggested that most declines in new construction could be explained by non-NSR factors, for example, the high cost of natural gas and investment uncertainty in the electrical utilities market stemming from “deregulation and the emergence of non-utilities [in electric generation].” *Id.* at 14, 24.

scope of NSR”—namely, projects that increase reliability, safety, and efficiency without actually increasing net emissions.¹¹²

Shortly after completing this report, the EPA issued its first of two final rules, aimed at “provid[ing] regulatory flexibility to industrial facilities.”¹¹³ This rule, published in December 2002, modifies the NSR program in four principal areas: determination of baselines, plantwide applicability limits (PALs), standards for “Clean Units,” and pollution control projects (PCPs).¹¹⁴ These changes were intended to “reduce burden, maximize operating flexibility, improve environmental quality, provide additional certainty[,] and promote administrative efficiency.”¹¹⁵ The second rule, published in October 2003, significantly revises the “routine maintenance, repair, and replacement” regulatory provision by essentially exempting from new source review changes that cost twenty percent or less of the replacement value of the unit being maintained, repaired, or replaced, even if they result in a significant net increase in emissions.¹¹⁶ With this second rule, the EPA aimed to add the “clarity and certainty” evidently lacking from its case-by-case four-factor approach to the routine maintenance exclusions.¹¹⁷ With both rules, the EPA claimed that it was attempting to turn a thirty-year record of case-by-case determinations and vague legislative guidance into clear regulations.

1. The First Rule: NSR Improvement.—The first rule changes the baselines for both actual and future emissions. These baselines are used to determine if a physical or operational change “result[s] in . . . a significant net emissions increase”¹¹⁸ and therefore mandates NSR review. For deter-

¹¹² EPA, NEW SOURCE REVIEW REPORT, *supra* note 97, at 11, 21, 32.

¹¹³ GAO REPORT, DATA, *supra* note 111, at 8.

¹¹⁴ EPA, PSD & NSR Rule, 67 Fed. Reg. 80,186, 80,187 (Dec. 31, 2002). *See also* John Boyd, *The New New Source Review: Teaching Old Sources New Tricks?*, 11 SOUTHEASTERN ENVTL. L.J. 401, 410 (2003).

¹¹⁵ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,189. The changes were first proposed, in a slightly different form, in the 1996 NSR Simplification Proposal. *See* Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR), 61 Fed. Reg. 38,250 (July 23, 1996). The 2002 rules differ from the 1996 proposals in several ways, including: an expanded list of eligible PCPs; elimination of the “primary purpose” test for PCPs, by which a project could only qualify as a PCP if its primary function was to reduce pollution; a slight change in clean unit eligibility criteria; and an extension of clean unit status from five to ten years for all clean units, including those that qualify through functional equivalence to BACT or LAER standards. *Compare* EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,232–33, *with* Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR), 61 Fed. Reg. 38,260–61; *see also* Choi, *supra* note 87, at 10,332–33.

¹¹⁶ EPA, Final Rule, Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion, 68 Fed. Reg. 61,248, 61,249–50 (Oct. 27, 2003).

¹¹⁷ *Id.*

¹¹⁸ Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, 45 Fed. Reg. 52,676 (Aug. 7, 1980); 40 C.F.R. § 52.21(b)(2)(i) (1980).

mining baseline actual emissions, the regulation now allows stationary sources to choose any consecutive twenty-four month period from the ten years immediately preceding the proposed modification.¹¹⁹ Under the previous rule, sources were required to base their pre-change actual emissions on their actual emissions from the consecutive twenty-four months immediately preceding the proposed modification.¹²⁰ The EPA claimed that the ten-year as opposed to two-year look-back was more representative of a plant's business cycle.¹²¹

For determining future emissions, the new rule allows a source to estimate its emissions based on projected capacity and usage, historic trends and emissions from the unit prior to the modification, and other factors—an “actual-to-projected-actual” test.¹²² Sources can exclude from this calculus increased emissions owing to growth in market demand (the “demand growth exclusion”).¹²³ Under the previous rule, which had applied to all but

¹¹⁹ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,198. Note, however, that electrical utility steam-generating units will still use their current method of calculating baseline actual emissions, which is based on average annual emissions from any consecutive twenty-four month period from the five years immediately preceding the proposed modification. *Id.* at 80,198; *see also* Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans; Standards of Performance for New Stationary Source, 57 Fed. Reg. 32,314 (July 21, 1992).

¹²⁰ 40 C.F.R. §§ 52.21(b)(21)(ii), 51.165(a)(1)(xii), 51.166(b)(21) (1980). Note, however, that under the old rule sources could base their actual emissions on a different twenty-four month time period if they could show that it was more representative of normal operations. *Id.* at § 51.21(b)(21)(ii); *see also* Choi, *supra* note 87, at 10,322.

¹²¹ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,198, 80,199–200.

¹²² *Id.* at 80,196–99. This “actual-to-projected-actual” calculation has applied to electrical utility steam-generating units since the *WEPCO* rulemaking, Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans; Standards of Performance for New Stationary Source, 57 Fed. Reg. at 32,314. *See supra* note 89. With its December 2002 rule, the EPA simply extended this method to non-utility units. *See* Robert J. Martineau, Jr., & Michael K. Stagg, *New Source Review Reform: A New Year's Eve to Remember*, 18 NAT. RESOURCES & ENV'T 3, 4 (2004). Some commentators suggest that this expansion of coverage will have little real effect given the current industry-wide use of potential-to-emit (PTE) limits; in effect, most states already use some form of the actual-to-actual test in assessing whether emissions increases will be significant. *See* David A. Golden, *The Need to Reform NSR Reform*, 12 NAT. RESOURCES & ENV'T 170, 173–74 (1998); *see also* EPA, 90-DAY REVIEW, *supra* note 97, at 6–7 (discussing PTE limits, whereby a modified source agrees in its NSR or PSD permit or through incorporation into the EPA-approved state incorporation plan to limit its potential to emit, for example by installing pollution controls or by restricting hours of operation).

¹²³ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,202–03. This demand growth exclusion has also applied to electrical utility steam-generating units since the 1992 *WEPCO* rulemaking, Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans; Standards of Performance for New Stationary Source, 57 Fed. Reg. at 32,314. Note that in 1998 the EPA had considered abolishing the exclusion, which then only applied to electrical steam-generating units, given the difficulty of differentiating increases owing to demand growth and increases owing to physical or operational change. EPA Notice of Availability, 63 Fed. Reg. 39,857, 39,860 (July 24, 1998). The EPA has not only retained the exclusion for electric-generation units, but has extended the exclusion to all other industries. *See* Choi, *supra* note 87, at 10,322–23. The D.C. Circuit found the EPA's change in position—from expressing “provisional dissatisfaction” in 1998 to fully

electrical utility steam-generating units, sources estimated future emissions using an “actual-to-potential” test that assumed continuous operation of the source except as limited by permit; sources could not include any limiting factors that were not federally enforceable, such as historic and usage trends, nor could they exclude growth in market demand.¹²⁴

These new baseline rule thus allow sources to choose an actual emissions figure that is relatively high—the highest of the previous ten years, even if it is aberrational—and to project a future emissions rate that is relatively low, incorporating all sorts of voluntary emissions limits and excluding market growth. This calculation makes it less likely that a plant’s modernization will be found to result in increased emissions. Furthermore, a source that believes its calculation yields “no reasonable probability” of a significant net emissions increase need not produce or maintain any records for the EPA—not even the very records upon which it bases its determination of “no reasonable probability.”¹²⁵

The regulation also institutes PALs, PCPs, and clean units. Plant-wide applicability limitations (PALs) are a voluntary option for stationary sources by which the sources adopt ceilings or caps on emissions levels on a plant-wide basis.¹²⁶ PALs then allow for a stationary source to make modifications and changes without triggering NSR regulations so long as the emissions remain below the established PAL for each pollutant.¹²⁷ To calculate the PAL, the source selects its actual emissions from any consecutive twenty-four month period from the prior ten years—even when emissions were highest—and adds to that level any permissible de minimis increase.¹²⁸ In effect, then, a source may use comparatively old emissions

embracing and extending the exclusion in 2002—to be legally irrelevant, and upheld the exclusion as consistent with the Clean Air Act and administrative law principles. *New York v. EPA*, 413 F.3d 3, 31–33 (D.C. Cir. 2005).

¹²⁴ Requirements for Preparation, Adoption, and Submittal of Implementation Plans; Approval and Promulgation of Implementation Plans, 45 Fed. Reg. 52,676 (Aug. 7, 1980). Federal courts had upheld the EPA’s use of the actual-to-potential test as it applied to all but electrical utility steam-generating units. *See, e.g., Puerto Rican Cement Co. v. EPA*, 889 F.2d 292, 296–97 (1st Cir. 1989) (upholding the EPA’s determination that factory renovations lowering hourly emissions rate nonetheless caused an “increase” in emissions because of significantly higher production levels). The regulatory exclusion for increases in hours of operation or production rate still applied—but only when unaccompanied by construction or modification. *See* 40 C.F.R. § 60.14(e) (1988) (NSPS program); *id.* § 52.21(b)(2)(iii) (PSD program).

¹²⁵ 40 C.F.R. § 52.21(r)(6).

¹²⁶ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,189. To the extent that PALs operate on a plant-wide basis, they are analogous to the EPA’s “bubble” program, under which the EPA determines compliance with emissions requirements on a plant-wide, and not an individual source, basis. *See* Nathaniel Lord Martin, Note, *The Reform of New Source Review: Toward a More Balanced Approach*, 23 STAN. ENVTL. L.J. 351, 369 (2004).

¹²⁷ EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,189, 80,206–09.

¹²⁸ *Id.* at 80,208.

reductions to offset emissions increases in the near term.¹²⁹ For example, a source that had high emissions levels a decade ago and had since reduced emissions could use those higher levels to establish a high PAL; the source could then undergo modifications that significantly increase emissions for that pollutant without triggering NSR.¹³⁰ The cap lasts ten years and automatically renews at the same level if the source is emitting at eighty percent or higher of its PAL, in effect rewarding sources that have not reduced their emissions by much over their ten-year grace period.¹³¹

Pollution control projects (PCPs) are similar voluntary programs that allow for NSR-avoidance. A PCP is any project or set of practices that results in “net overall environmental benefits,” including projects that reduce the emissions rate of one pollutant while increasing, but to a lesser extent, the emissions rate of a different “collateral” pollutant.¹³² Existing sources can install approved PCPs without triggering NSR review, even if the installation would otherwise constitute a “major modification” because of an increase in emissions of a pollutant.

Clean units, in turn, may undergo certain modifications or changes without triggering further NSR review so long as their clean unit technology is maintained.¹³³ The regulations define a “clean unit” as any unit that uses state-of-the-art pollution controls, meaning it either obtained a BACT or LAER permit within the last ten years or achieved emissions levels demonstrably comparable to BACT or LAER.¹³⁴

The rule prompted a quick negative response. Nine northeastern states immediately filed suit against the EPA, claiming the EPA’s rulemaking—in particular the exemptions for clean units and the new method of baseline emissions calculations—exceeded the EPA’s authority under the Clean Air Act.¹³⁵ As a press release from the Attorney General of New York noted,

¹²⁹ See Dennis D. Hirsch, *Lean and Green? Environmental Law and Policy and the Flexible Production Economy*, 79 IND. L.J. 611, 657 (2004).

¹³⁰ See *id.* at 657–58.

¹³¹ The PAL may be renewed at a lower level if the source is emitting below eighty percent of its cap. EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,209–10, 80,216, 80,219–20; see also Hirsch, *supra* note 129, at 652 n.323 (“This [renewal] arrangement . . . give[s] participating facilities a perverse incentive *not* to reduce their actual emissions by more than 20% below the original PAL level,” or, “[s]tated differently, . . . dissuades sources from reducing their emissions by more than 2% per year (on average) over the ten years of their permit term.”).

¹³² EPA, PSD & NSR Rule, 67 Fed. Reg. at 80,232. Note that non-air pollution impacts will not be included in the “environmentally beneficial” calculation. *Id.* at 80,234.

¹³³ *Id.* at 80,189.

¹³⁴ *Id.* at 80,190, 80,223–29.

¹³⁵ Boyd, *supra* note 114, at 401 n.6 (citing Katherine Q. Seeye, *Nine Northeastern States File Suit over New Rules on Pollution*, N.Y. TIMES, Jan. 1, 2003, at A1); Press Release, Office of N.Y. State Att’y Gen. Eliot Spitzer, *Nine States Sue Bush Administration for Gutting Key Component of Clean Air Act* (Dec. 21, 2002), available at http://www.oag.state.ny.us/press/2002/dec/dec31b_02.html (“The Attorneys General believe that these changes are so sweeping and damaging that the Environmental Protection Agency can not make them without Congressional approval. The rollbacks violate both the Clean

“[t]he Clean Air Act was initially adopted by Congress to improve air quality. There is no evidence from the EPA that air quality will improve as a result of the NSR changes and significant reason to believe that air quality will worsen.”¹³⁶ In addition, Senators John Edwards, John Kerry, and Joseph Lieberman attached a rider to a 2003 spending bill to delay the implementation of the new rule for six months; the Senate, however, defeated this effort on January 22, 2003.¹³⁷ Congress also requested that the General Accounting Office (GAO) review the EPA’s foundation for promulgating the new rules. The GAO promptly investigated, and it released a report in August 2003 stating that “because [the] EPA relied primarily on anecdotal information from industry rather than a statistically valid sample or industrywide survey, the agency’s findings do not necessarily represent NSR’s effect on energy efficiency projects throughout the industries subject to the program.”¹³⁸

Just before the release of the GAO report, in July 2003, the EPA announced that it would reconsider parts of the December NSR rule. In this announcement, the EPA requested comments on six limited areas of the rule, including the designation of clean units, the method of assessing air emissions from a twenty-four month baseline period, and the method of measuring emissions increases.¹³⁹ In late October 2003, the EPA responded to these comments and preserved most of the rule as is, with only two minor adjustments.¹⁴⁰

In a per curiam opinion delivered in June 2005, the District of Columbia Circuit upheld key provisions of the regulation as permissible interpretations of the Clean Air Act entitled to *Chevron* deference and as not otherwise “arbitrary and capricious” under the Administrative Procedure Act.¹⁴¹ The court rested much of its decision on the ambiguity of the statutory term “increases” and the broad deference owed agency decisions and

Air Act itself and the Administrative Procedure Act, which sets forth the process government agencies must follow to promulgate regulations.”)

¹³⁶ Press Release, Office of N.Y. State Att’y Gen. Eliot Spitzer, Ten States Seek to Put New Dirty Air Rules on Hold (Feb. 6, 2003), available at http://www.oag.state.ny.us/press/2003/feb/feb06a_03.html.

¹³⁷ Steven D. Cook, *Air Pollution: Senate Narrowly Rejects Effort to Delay EPA New Source Review Regulation Changes*, Daily Env’t Rep. (BNA) No. 15, at A-1 (Jan. 23, 2003).

¹³⁸ GAO REPORT, DATA, *supra* note 111, at 16–17; see also *GAO Faults EPA on Air Standards; Agency Lacked Data to Ease Rules*, CHI. TRIB., Aug. 26, 2003, at 11.

¹³⁹ EPA, New Source Review Reconsideration Fact Sheet, <http://www.epa.gov/nsr/documents/factsheet.pdf> (last visited May 27, 2007).

¹⁴⁰ See Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NSR): Reconsideration, 68 Fed. Reg. 63,021 (Oct. 30, 2003) (where the EPA refined the technical definition of “replacement unit” and clarified that the PAL-baseline calculation for newly constructed units does not apply to modified units). See also Martin, *supra* note 126, at 366.

¹⁴¹ *New York v. EPA*, 413 F.3d 3, 10 (D.C. Cir. 2005). The panel consisted of Judges Rogers, Tatel, and Williams.

predictive judgments, especially in highly technical areas.¹⁴² The court upheld the following provisions: the actual-to-projected-actual baseline test; the ten-year look-back period (as well as the five-year look-back for electrical utilities); the growth demand exclusion; and the PAL program.¹⁴³ The court did, however, vacate two provisions as clearly contradictory to statutory language: the clean unit applicability test, by which the EPA measured only emissions limitations and not actual emissions, and the PCP exception as it applied to projects causing collateral increases in pollution.¹⁴⁴ In addition, the court remanded to the EPA for adequate explanation of the EPA's decision to exempt a source from the recordkeeping requirements if the source owner or operator believes that its proposed modification shows "no reasonable possibility" of a significant emissions increase.¹⁴⁵

2. *The Second Rule: Equipment Replacement.*—While the agency continued to receive comments on its December 31, 2002 rule, it promulgated a second final rule regarding NSR. This rule, published in the Federal Register on October 27, 2003 and meant to take effect on December 26, 2003, rewrote the "routine maintenance, repair, and replacement" provision of the regulations for both attainment and nonattainment areas.¹⁴⁶ The EPA asserted that the revision was meant to add certainty and clarity to the EPA's previous case-by-case determination and to "remove disincentives to undertaking [routine maintenance] activities . . . [that] enhance[e] . . . efficiency, safety, reliability, and environmental performance."¹⁴⁷ Under the new rule, an activity qualifies as "routine" and therefore escapes NSR scrutiny if

- (1) it involves replacement of any existing component(s) of a process unit with component(s) that are identical or that serve the same purpose as the replaced component(s);¹⁴⁸ (2) the fixed capital cost of the replaced component, plus

¹⁴² *Id.* at 18, 23, 39–40.

¹⁴³ *Id.* at 10.

¹⁴⁴ *Id.* at 10, 36–39.

¹⁴⁵ *Id.* at 10–11, 33–36; see EPA, PSD & NSR Rule, 67 Fed. Reg. 80,279 (Dec. 31, 2002); 40 C.F.R. § 52.21(r)(6) (2002).

¹⁴⁶ EPA, Final Rule, Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion, 68 Fed. Reg. 61,248, 61,249–50, 61,252 (Oct. 27, 2003). This rule was first released to the public in August 2003 via the EPA's website.

¹⁴⁷ *Id.* at 61,251.

¹⁴⁸ A "process unit" is defined as a "collection of structures and/or equipment that processes, assembles, applies, blends, or otherwise uses material inputs to produce or store an intermediate or completed product." *Id.* at 61,259. Excluded from this definition are non-emitting facilities that are distinct from the source's emitting components, such as administrative buildings and storage warehouses. *Id.* at 61,262. Also excluded is pollution control equipment that does not serve a "dual purpose" as process equipment; examples of such non-excludable "dual purpose" technology are condensers, recovery devices, and oxidizers. *Id.* at 61,260–61. Note that the installation of identical or functionally equivalent pollution control may also qualify for exclusion from NSR as a PCP. See *supra* notes 132–34 and accompanying text.

costs of any activities that are part of the replacement activity, does not exceed 20 percent of the current replacement value of the process unit;¹⁴⁹ and (3) the replacement(s) does not alter the basic design parameters of the process unit or cause the process unit to exceed any emission limitation or operational limitation (that has the effect of constraining emissions) that applies to any component of the process unit and that is legally enforceable.¹⁵⁰

Projects that qualify for the rule's "safe harbor" would automatically be exempt from new source review. Projects that do not qualify for the automatic exclusion could nonetheless qualify for the exclusion under the *WEPCO* four-factor test.¹⁵¹ The new rule thus expands the scope of grandfathering relief by providing an independent avenue for relief.

With its broad swath of exclusions, this new rule would exempt thousands of facilities from NSR requirements.¹⁵² Old sources would be able to "run harder and longer"¹⁵³ without having to install new pollution controls, effectively gaining "perpetual immunity" from NSR requirements.¹⁵⁴ Representatives from environmental groups and legislative opponents claimed

¹⁴⁹ In estimating costs, a source operator can choose amongst various measurements, including appraisal value, insurance value, and investment value as adjusted for inflation. Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion, 68 Fed. Reg. at 61,262. Replacement activities that are "related" must be aggregated in this cost-threshold calculation, though merely contemporaneous activities are not necessarily sufficiently related to require aggregation. *Id.* at 61,258. Note that the EPA maintains that this twenty percent cut-off is consistent with *Wisconsin Electric Power Co. v. Reilly (WEPCO)*, 893 F.2d 901, 910–11 (7th Cir. 1990), in which the court deemed WEPCO's activities ineligible for the "routine maintenance" exception. See *supra* note 55 and accompanying text. Using 1991 dollars, the EPA estimated that WEPCO's replacement of steam drums and air heaters cost between twenty-two and twenty-nine percent of the units' total replacement value. Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion, 68 Fed. Reg. at 61,257. Some commentators, however, have challenged the EPA's calculations of WEPCO's costs. See Adrian P. Castro, Note, *Far From Routine: Exempting Existing Sources From New Source Review Under the Equipment Replacement Provision*, 33 HOFSTRA L. REV. 711, 746 (2004).

¹⁵⁰ Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion, 68 Fed. Reg. at 61,252. Examples of basic design parameters are maximum heat input and fuel input specifications, as well as output-based measurements. *Id.* at 61,258–59. Source owners and operators can propose design parameters of their choosing to the reviewing authority. *Id.* at 61,259.

¹⁵¹ *Id.* at 61,251–52, 61,257.

¹⁵² Catherine Cash & Gerald Karey, *EPA Issues Final Rule 'Clarifying' NSR Restriction*, INSIDE ENERGY WITH FED. LANDS, Sept. 1, 2003, at 1; Castro, *supra* note 149, at 743. The Natural Resources Defense Council (NRDC) estimated that the rule will allow more air pollution from 17,000 industrial sources across the country. See Press Release, NRDC, Bush Administration to Gut Clean Air Act (Aug. 22, 2003), available at <http://www.nrdc.org/media/pressreleases/030822.asp>.

¹⁵³ Cash & Karey, *supra* note 152, at 3 (citing Conrad Schneider, an official with the Clean Air Task Force).

¹⁵⁴ The courts have long ruled that the "grandfathering" provisions of NSR were not intended to provide "perpetual immunity" to existing sources. See, e.g., *Ala. Power Co. v. Costle*, 636 F.2d 323, 400 (D.C. Cir. 1979) ("The statutory scheme intends to 'grandfather' existing industries; but the provisions concerning modifications indicate that this is not to constitute a perpetual immunity from all standards under the PSD program.").

the rule ““eviscerate[d]’ the NSR program” and “flatly contradict[ed] the clear language of the Clean Air Act.”¹⁵⁵

As did the earlier rule, the October 2003 rule generated a quick negative response. Twelve states, local governments, and a coalition of environmental and public health advocacy groups filed suit against the EPA, claiming violation of the Clean Air Act.¹⁵⁶ They argued that only Congress has the authority to enact such significant changes to the Clean Air Act and that the EPA cannot simply ignore the purpose and intent of Congress in exercising its rulemaking powers.¹⁵⁷ The District of Columbia Circuit stayed implementation of the rule on December 24, 2003, two days before the rule was to take effect.¹⁵⁸

In July 2004, the EPA issued an administrative stay and announced that it would reconsider the rule; the legal proceedings were stayed pending the EPA’s decision.¹⁵⁹ In September 2004, the EPA Office of the Inspector General issued a report solicited by the Senate that sharply criticized the rule, in particular the twenty percent threshold and the EPA’s conclusion that the rule would not result in increased emissions. The EPA strongly disputed these findings.¹⁶⁰

In early June 2005, the EPA, having finished reconsideration, announced that it would preserve the routine maintenance rule as adopted in October 2003.¹⁶¹ Legal proceedings resumed. In March 2006, the District of Columbia Circuit invalidated the rule,¹⁶² holding unanimously that the rule was inconsistent with the statutory definition of “modification” as “*any physical change* in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted.”¹⁶³ In July 2006, the District of Columbia Circuit denied requests

¹⁵⁵ Cash & Karey, *supra* note 152. The first quotation is by Bill Becker, head of a state and local air pollution control association; the second is by Senator Joseph Lieberman.

¹⁵⁶ See J.R. Pegg, *States Sue to Block Bush’s Clean Air Act Revisions*, ENV’T NEWS SERVICE, Oct. 27, 2003, available at <http://www.climateark.org/shared/reader/welcome.aspx?linkID=26622>; Dan Fagin, *Clean-Air Rewrite Finalized, Finally; Dozen States, Environmentalists Sue*, NEWSDAY, Oct. 28, 2003, at A16.

¹⁵⁷ Fagin, *supra* note 156, at A16. See also Petition for Review, *New York v. EPA* (D.C. Cir. Oct. 27, 2003), available at www.oag.state.ny.us/press/2003/oct/rmrr_rule_petition_for_review.pdf.

¹⁵⁸ *New York v. EPA*, No. 03-1380, 2003 U.S. App. LEXIS 26520 (D.C. Cir. Dec. 24, 2003) (granting motion to stay enforcement of the routine maintenance rule).

¹⁵⁹ See *EPA Sends Decision on Reconsideration of Equipment Replacement Rule to OMB*, Chem. Reg. Daily (BNA) (June 1, 2005).

¹⁶⁰ OFFICE OF INSPECTOR GEN., EVALUATION REPORT, *supra* note 211.

¹⁶¹ News Release, EPA, *New Source Review Response Stresses Improvements to Permitting Programs* (June 6, 2005).

¹⁶² *New York v. EPA*, 443 F.3d 880 (D.C. Cir. 2006).

¹⁶³ *Id.* at 883 (quoting 42 U.S.C. § 7411(a)(4) (emphasis supplied by the court)).

for rehearing and rehearing en banc.¹⁶⁴ At least one industry source speculated that the EPA would appeal the decision to the Supreme Court,¹⁶⁵ and indeed the EPA did just that, albeit unsuccessfully.¹⁶⁶ But there are indications that the EPA will effectively implement its revised routine maintenance rule through its enforcement discretion.¹⁶⁷ Thus, even the one aspect of the EPA's revisions to the NSR regulations that has met with judicial resistance may yet be implemented.

In summary, in 2002 the Bush Administration undertook a clear break with the practice of more than two decades—by Democratic and Republican administrations alike—of trying to derive a consistent, workable definition of the term “modification” as used in the Clean Air Act. The Bush Administration abandoned the prior efforts and significantly expanded the scope of the grandfathering of existing plants so that these plants get the benefits of modernization without expending the costs to meet the requirements of the Clean Air Act. Nor is the trend at an end: the EPA has announced plans to further narrow the scope of “modifications” that would trigger new source review.¹⁶⁸

E. The Judiciary and Grandfathering

The Executive is not the only branch of government that has sought to expand grandfathering in recent years. The government brought suit in 2005 against the Duke Power Company, alleging that the utility had failed (under the regulations before the Bush Administration amendments) to comply with the new source review requirements under the PSD program. Duke Power Company argued that its actions did not trigger new source review even though its net emissions post-modifications increased because its hourly emissions rate did not increase.

The district court in North Carolina, and then the Fourth Circuit, agreed. The district court reasoned that the EPA's PSD regulations on their face required an increase in hourly emissions rate for there to be a “major modification.”¹⁶⁹ The Fourth Circuit affirmed; the court held that the EPA's

¹⁶⁴ See Steven D. Cook, *D.C. Circuit Will Not Reconsider Decision to Cancel Changes to New Source Review*, 37 Env't Rep. (BNA) 1405, 1405 (July 7, 2006).

¹⁶⁵ *Id.* (quoting Scott Segal, Director of the Electric Reliability Coordinating Council).

¹⁶⁶ Petition for Writ of Certiorari, *EPA v. New York*, 127 S. Ct. 2127 (2007) (No. 06-736), *cert. denied*, 127 S. Ct. 2127 (2007).

¹⁶⁷ See Steven D. Cook, *Effect of New Source Review Decision Limited by EPA Policy, Proposed Rule*, 37 Env't Rep. (BNA) 662, 662 (Mar. 31, 2006).

¹⁶⁸ Cook, *supra* note 13, at A-2 (“The [EPA] said it is moving forward with a proposed rulemaking to narrow the definition of the emissions increases that trigger new source review emissions control requirements . . .”). Indeed, the EPA has indicated that this remains the case even in the wake of the Supreme Court's decision in the *Duke Energy* case. See *id.*

¹⁶⁹ *United States v. Duke Energy Corp.*, 278 F. Supp. 2d 619, 640–42 (M.D.N.C. 2003), *aff'd*, 411 F.3d 539 (4th Cir. 2005), *rev'd sub nom. Env'tl. Def. v. Duke Energy Corp.*, 127 S. Ct. 1423 (2007). The

PSD regulations should not be read to deem an increase in net emissions a major modification that triggered new source review on the ground that such a reading would render the PSD regulations inconsistent with the EPA's NSPS regulations,¹⁷⁰ which looked to increases in hourly emissions rate as the basis for new source review.¹⁷¹ The Fourth Circuit reasoned that Congress's decision to define the term "modification" in the PSD statute by reference to the definition of the same term in the NSPS statute mandated the EPA to define the term identically in its regulations.

Leaving to the side the issues of statutory interpretation and administrative law, it is clear that the reasoning of the district court and that of the Fourth Circuit reflect an expansive view of the scope of grandfathering under the Clean Air Act. Renovations often allow companies to leave their plants in operation for longer hours with no greater hourly emissions rates than they exhibited before the renovations. Exempting such renovations from triggering new source review leaves such plants to continue to enjoy the benefits of grandfathering. As Judge Posner explained in *United States v. Cinergy Corp.*, a case rejecting the Fourth Circuit's reasoning, such an interpretation "would give [a] company an artificial incentive to renovate a plant and by so doing increase the hours of the plant's hours of operation, rather than to replace the plant."¹⁷² The District of Columbia Circuit also rejected the Fourth Circuit's reasoning in the course of reviewing challenges to the Bush Administration's proposed regulations.¹⁷³ However, a district court in Alabama agreed with the reasoning of the North Carolina federal district court¹⁷⁴ and subsequently expressly dismissed the Seventh Circuit's reasoning in *Cinergy*.¹⁷⁵

Though the government took the position before the district court and Fourth Circuit that an increase in net emissions triggered new source review, it did not seek review of the Fourth Circuit's decision in the Supreme

district court found support in the regulation's exemption from new source review for mere increases in hours of operation. *See id.*

¹⁷⁰ *Duke Energy*, 411 F.3d at 550.

¹⁷¹ *Id.* at 542.

¹⁷² 458 F.3d 705, 709 (7th Cir. 2006), *petition for cert. denied*, 127 S. Ct. 2034 (2007).

¹⁷³ *See New York v. EPA*, 413 F.3d 3 (D.C. Cir. 2005).

¹⁷⁴ *United States v. Ala. Power Co.*, 372 F. Supp. 2d 1283, 1298–99 (N.D. Ala. 2005).

¹⁷⁵ *United States v. Ala. Power Co.*, No. 2:01-CV-00152-VEH, 2006 WL 4012179, at *2–3 (N.D. Ala. Aug. 28, 2006); Steven D. Cook, *U.S. Court Reaffirms Decision on Emissions, Criticizes Conclusions from Seventh Circuit*, 21 *Toxics Law Rep.* (BNA) No. 35, at 830 (Sept. 7, 2006).

The government appealed the district court's determination in October 2006. *Government Appeals Summary Judgment by District Court in Alabama Power Case*, 36 *Env't Rep.* (BNA) 2118, 2118 (2006). The Eleventh Circuit subsequently asked the parties to brief the question of whether it had proper jurisdiction over the matter in light of the District of Columbia Circuit's exclusive jurisdiction to consider challenges to regulations. *See Steven D. Cook, Eleventh Circuit Questions Jurisdiction to Hear Appeal in Alabama Power Case*, 37 *Env't Rep.* (BNA) 2232, 2232 (2006). The appellate court has yet to decide the case and now presumably will consider the Supreme Court's holding in the *Duke Energy* case in its ruling.

Court. Environmental organizations that had intervened in the case as plaintiffs did, however, and the Supreme Court agreed to hear the appeal.¹⁷⁶ Earlier this year, the Court rejected the district court's and the Fourth Circuit's reasoning,¹⁷⁷ holding that Congress could employ a referential definition yet leave room for the EPA to define "modification" differently under the NSPS and PSD programs.¹⁷⁸

The Court's rejection of an expansive view of grandfathering under the Clean Air Act apparently will not prevent the Bush Administration from further pushing to extend even greater grandfathering. The same day the Court decided *Duke Energy*, the EPA announced that, notwithstanding the Court's decision, it would move forward with additional revisions to the NSR regulations to further narrow the scope of modifications that trigger new source review.¹⁷⁹ Indeed, one industry spokesperson asserted that, insofar as the Court's decision was grounded on statutory interpretation and administrative law rather than policy, the case simply affirmed the EPA's broad discretion and, as such, "should actually place prospective rulemaking on firmer ground."¹⁸⁰ And almost immediately, the EPA heeded this plea by proposing regulations for power plants that are consistent with the Fourth Circuit's approach and contrary to the position that the government had pressed before the Fourth Circuit.¹⁸¹ Further, in cases in which the EPA has published proposed regulations expanding the scope of grandfathering, it has indicated that it will bring enforcement actions only for violations of these proposed rules, and not for violations of the more stringent rules in effect at the time of the conduct.¹⁸²

II. EFFECTS ON NEW INVESTMENT AND AIR QUALITY

In the remainder of this Article, we critically examine the EPA's recent revisions to the new source review regulations. In this Part, we discuss how

¹⁷⁶ *Env'tl. Def. v. Duke Energy Corp.*, 126 S. Ct. 2019 (2006).

¹⁷⁷ *See Env'tl. Def. v. Duke Energy Corp.*, 127 S. Ct. 1423, 1435 (2007) (criticizing the district court for assuming that the EPA's decision to exempt mere increases in hours of operation would also necessarily exempt physical changes that resulted in increased hours of operation).

¹⁷⁸ *See id.*

¹⁷⁹ *See Cook, supra* note 13, at A-2 ("The decision does not affect [the] EPA's plan to proceed with the emissions test rule," EPA spokeswoman Jennifer Wood told BNA April 2.)

¹⁸⁰ *Id.* (quoting Scott Segal, Director of the Electric Reliability Coordinating Council).

¹⁸¹ *See supra* note 11 and accompanying text.

¹⁸² *See* Steven D. Cook, *EPA Preparing New Source Review Cases against Utilities Lacking Modern Controls*, Chem. Reg. Daily (BNA) (Mar. 29, 2007); Steven D. Cook, *EPA Places Low Priority on Newly Detected Violations of Rules for New Source Review*, Daily Env't Rep. (BNA) No. 189, at A-6 (Sept. 29, 2006) (describing letter from the EPA to Senator Inhofe that reaffirmed adherence to the hourly emissions standard in enforcement despite the D.C. Circuit opinion invalidating the regulatory provision); *see also* Shi-Ling Hsu, *The Real Problem with New Source Review*, 36 ENVTL. L. REP. 10,095, 10,101-02 (2006) (noting the EPA's poor record at prosecuting new source review violations).

the new regulations would prolong the existence of older, dirtier facilities and give polluters incentives to make undesirable investment decisions.

A. Prolonged Existence of Older Plants

Before we turn to a specific examination of how the new regulations would prolong the existence of older plants, we explain in general terms how a differential system with stringent regulations for new plants and a virtual lack of regulation of existing sources creates a disincentive to modernization. We then explain how the current statutory and regulatory framework specifically creates such a disincentive.

1. The "Old Plant Effect" in General.—Different regulatory standards for old and new plants distort the economic analysis that existing plant owners undertake when deciding whether to modernize or replace a plant. Stricter standards for new and substantially modified plants make building a new plant or substantially modifying an old plant more expensive propositions than they otherwise would be. In contrast, laxer standards for existing plants make retaining unmodified, older plants in operation a less expensive option. The academic literature refers to this phenomenon as the "old plant effect."¹⁸³

The old plant effect manifests itself in two ways. First, older plants are maintained in operation longer than is economically efficient, as empirical evidence demonstrates.¹⁸⁴ For example, Randy Nelson, Tom Tietenberg,

¹⁸³ See BRUCE A. ACKERMAN & WILLIAM T. HASSLER, CLEAN COAL/DIRTY AIR 67–68 (1981) (discussing the "old plant effect" resulting from the Clean Air Act); Robert W. Crandall, *The Political Economy of Clean Air: Practical Constraints on White House Review*, in ENVIRONMENTAL POLICY UNDER REAGAN'S EXECUTIVE ORDER: THE ROLE OF BENEFIT-COST ANALYSIS 205, 212 (V. Kerry Smith ed., 1984) ("[While r]etrofitting to get a given discharge rate is likely to be much more expensive than designing the plant and equipment to meet the same standard[,] [t]his does not mean . . . that the new source standards should be pressed so tightly that the incremental cost of control (per unit of pollution) is even higher than incremental costs at existing plants."); Hsu, *supra* note 182, at 10,096–97 (describing the old plant effect in the context of new source review); Nathaniel O. Keohane, Richard L. Revesz & Robert N. Stavins, *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313, 315 n.10 (1998) ("When new source standards are sufficiently more stringent, . . . they can give rise to an 'old-plant' effect, precluding plant replacements that would otherwise take place."); Matthew D. McCubbins, Roger G. Noll & Barry R. Weingast, *Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431, 467 (1989) ("A clear implication of [grandfathering existing sources] was that existing facilities would be protected from the possibility that stringent air pollution regulation would hasten their obsolescence," thus avoiding "a 'least cost' strategy for achieving a given air quality target [that] . . . involve[s] replacing older facilities with newer ones."); cf. Richard B. Stewart, *Regulation, Innovation, and Administrative Law: A Conceptual Framework*, 69 CAL. L. REV. 1256, 1270 (1981) ("Imposing [comparatively] stringent controls on existing plants may lead to plant closings and job losses . . .").

¹⁸⁴ Beyond the studies discussed in the text, see, for example, Crandall, *supra* note 183, at 212–13 (presenting empirical evidence of new source bias); Randy A. Nelson, *The Effects of Regulation on Capacity Utilization: Evidence from the Electric Power Industry*, 29 Q. REV. ECON. & BUS. 37, 42 (1989) (finding a statistically significant decrease in the relationship of capital investment and capacity utilization after regulation, comparing samples from 1961–1969 to samples from 1976–1983); Timothy J.

and Michael Donihue present empirical evidence that differential environmental regulations delay plant retirement.¹⁸⁵ Michael Maloney and Gordon Brady agree,¹⁸⁶ concluding that environmental regulations produce an average four-year increase in plant retention, and also finding that increased environmental regulation is negatively correlated with new plant construction.¹⁸⁷ Randy Becker and Vernon Henderson likewise conclude that grandfathering outside the electricity-generating industry had the effects of “rais[ing] survival rates [of plants,] limiting ‘natural’ plant turnover, and keeping otherwise unprofitable operations in business.”¹⁸⁸ Robert Stavins recently canvassed empirical examinations of the effects of vintage-differentiated environmental regulations as part of a study of new source review of motor vehicle emissions.¹⁸⁹ He notes that more stringent regulation of new motor vehicles depressed new car sales “by between 2% and 4% over the first five years after the regulation came into force.”¹⁹⁰ Moreover, his more general survey confirms the general notion that application of more stringent standards to new sources tends to lengthen the lives of older plants, both inside and outside the electricity-generating industry.¹⁹¹

Second, more stringent standards on new sources may worsen environmental quality because they discourage the introduction of those new sources that would be subject to their requirements. This reaction thus ren-

Stanton, *Capacity Utilization and New Source Bias: Evidence from the US Electric Power Industry*, 15 ENERGY ECON. 57 (1993) (case study of electrical plants before and after the 1970 Clean Air Act, finding the least degree of regulation to be positively correlated with a higher capacity utilization, even though newer facilities were more efficient energy producers); Byron Swift, *How Environmental Laws Works: An Analysis of the Utility Sector’s Response to Regulation of Nitrogen Oxides and Sulfur Dioxide Under the Clean Air Act*, 14 TUL. ENVTL. L.J. 309, 406–09 (2001) (regulatory standards for both sulfur dioxide and nitrogen oxides created no incentive for the retirement of old facilities or the construction of new, more efficient facilities).

¹⁸⁵ Randy A. Nelson, Tom Tietenberg & Michael R. Donihue, *Differential Environmental Regulation: Effects on Electric Utility Capital Turnover and Emissions*, 75 REV. ECON. & STAT. 368, 373 (1993).

¹⁸⁶ Michael T. Maloney & Gordon L. Brady, *Capital Turnover and Marketable Pollution Rights*, 31 J.L. & ECON. 203, 206 (1988).

¹⁸⁷ *Id.* at 215–22.

¹⁸⁸ Randy Becker & Vernon Henderson, *Effects of Air Quality Regulations on Polluting Industries*, 108 J. POL. ECON. 379, 415 (2000).

¹⁸⁹ Robert N. Stavins, *Vintage-Differentiated Environmental Regulation*, 25 STAN. ENVTL. L.J. 29 (2006).

¹⁹⁰ *Id.* at 46 (citing Howard K. Gruenspecht, *Differentiated Regulation: The Case of Auto Emissions Standards*, 72 AM. ECON. REV. 328, 330 (1982)).

¹⁹¹ *Id.* at 50–56; see also John A. List, Daniel Millimet & Warren McHone, *The Unintended Disincentive in the Clean Air Act*, 4 ADVANCES IN ECON. ANAL. & POL’Y 1 (2004) (finding empirical evidence that new source review retards modification rates while doing little to accelerate the closure of existing dirty plants). *But see* Arik Levinson, *Grandfather Regulations, New Source Bias, and State Air Toxics Regulation*, 28 ECOLOGICAL ECON. 299 (1999) (finding no statistically significant differences in capital vintage or investment between plants in states that grandfather new sources of pollution, plants in states that have no air toxics regulations, and plants in states that regulate both new and existing sources).

ders the stringent new source standards largely irrelevant.¹⁹² Once again, empirical evidence bears out this prediction. Stavins explains that as a result of the incentive to keep older motor vehicles in operation, motor vehicle pollution emissions actually rose for several years following the introduction of stricter pollution control standards for new vehicles.¹⁹³

An example, summarized in Table 1, illustrates the point. Consider *A*, the owner of a power-generating plant. *A* is contemplating replacing the plant. In making this decision, *A* will take into account the costs and benefits of any action. Presumably, *A* will factor into her economic analysis the costs necessary to comply with applicable environmental requirements.¹⁹⁴ To the extent that environmental compliance costs are identical, the environmental regulation will not influence *A*'s decision. If, however, the environmental compliance costs vary depending upon *A*'s action, that differential may well distort *A*'s decision.

Say that the annual operating cost of an existing facility is \$100, while—as one might expect because of the greater efficiencies generally offered by newer plants—the annual operating cost of a new facility with the same production capacity is \$90 (including annualized capital cost). Assuming that *A* acts economically, *A* will choose to construct a new facility. This result will not change if the applicable environmental regulation imposes uniform compliance costs.

But now say that the applicable environmental regulation imposes costs of \$20 if *A* constructs a new facility but no cost if *A* retains her existing facility. The modified annual operating cost of a new facility is \$110, while the annual operating cost of the existing facility remains \$100. Accordingly, *A* will now opt to retain her existing facility in operation.

¹⁹² See BIEWALD ET AL., *supra* note 18, at 3 (finding that the complete elimination of grandfathering of old plants would reduce sulfur dioxide emissions by 7.3 million tons and nitrous oxide emissions by 3.3 million tons, amounting to a 75% reduction in the emissions of these pollutants by old plants, and that the elimination of the “old plant effect” would result in an approximately 40% reduction in total sulfur dioxide emissions and a 15% reduction in total nitrous oxide emissions); Maloney & Brady, *supra* note 186, at 222–24 (finding that a 1% increase in the age of a plant results in a 1% increase in emissions and that, at the time of the study, regulations had caused a 27% increase in total emissions).

¹⁹³ See Stavins, *supra* note 189, at 46.

¹⁹⁴ We assume that plant owners will act in their economic self-interest. That need not be entirely the case; for example, plant owners might choose to reduce pollution for altruistic reasons. Cf. Timothy F. Malloy, *Regulating by Incentives: Myths, Models, and Micromarkets*, 80 TEX. L. REV. 531, 532–36 (2002) (questioning the notion that corporations are monolithic actors that seek always and only to maximize profits). But even if other motivations may drive owners to some extent, it is reasonable to expect that economic self-interest will remain a substantial consideration.

Table 1: Example of the “Old Plant Effect”

A, the owner of a power-generating plant, is contemplating upgrading or replacing the plant.

<i>Situation 1: Absent Environmental Regulation</i>	
Annual operating cost of the existing facility (including annualized capital cost)	\$100
Annual operating cost of a comparable new facility (including annualized capital cost)	\$90
<i>A will choose to construct a new facility.</i>	

<i>Situation 2: With Environmental Regulation</i>	
Cost of environmental regulation for a new facility	\$20
Cost of environmental regulation for an existing facility	\$0
Annual operating cost of the existing facility	\$100
Annual operating cost of a new facility	\$110
<i>A will now opt to retain her existing facility in operation.</i>	

The environmental regulation thus distorts *A*'s behavior. In effect, the law creates a barrier to new plant construction.¹⁹⁵ In this scenario, firms will be less likely to construct new plants than they would be in the absence of regulation.¹⁹⁶ And the incentive to retain older plants in operation may give rise to a perverse result: Environmental conditions may be worse with more stringent regulation than they would be under less stringent regulation. An extension of the above example makes this clear. Assume that the old plant emits five units of pollution per ton of output; that a new, unregulated plant would emit three units because of its greater efficiency; and that a new plant subject to regulation would emit one unit. To the extent that, as in the example, the plant owner opts to retain her existing facility in operation, the old plant effect will result in the continuing emission of five units.

¹⁹⁵ Cf. Jonathan Remy Nash, *Too Much Market? Conflict Between Tradable Pollution Allowances and the “Polluter Pays” Principle*, 24 HARV. ENVTL. L. REV. 465, 505–06 (2000) (arguing that tradable pollution permit regimes that “grandfather” permits to existing polluters give rise to a barrier to exit, i.e., an incentive “not to *exit* the industry[,] by shielding [grandfathered firms] from new competition”). The environmental regulation described in the text would probably not give rise to a barrier to exit since the issue is not one of competition from new market entrants: Electricity-generating utilities will either retain existing plants in existence (modernized or otherwise) or construct new plants. Nonetheless, the barriers to exit and new plant construction arise out of similar incentive effects.

¹⁹⁶ See Becker & Henderson, *supra* note 188, at 415 (concluding, based upon empirical data, that “[g]randfathering of preregulation plants raises [plant] survival rates, limiting ‘natural’ plant turnover and keeping otherwise unprofitable operations in business”).

In contrast, if new plants were unregulated, the facility owner would opt to erect a new facility in place of the old plant, with a resulting pollution level of only three units. Thus, less stringent environmental regulation may increase environmental quality.

But more stringent environmental regulation for new sources will not *always* lead to worse environmental quality. In some variations—for example, if the annualized cost of complying with new source regulation is \$8 instead of \$20—the old plant will close down and be replaced by a new, regulated plant. In general, the question whether grandfathering combined with more stringent regulation of new sources will lead to more pollution is an empirical one. Grandfathering and more stringent regulation could lead to more or less pollution. They also might lead to more pollution in the short run (while the lives of existing sources are extended) but less pollution in the long run (once existing sources are eventually retired), as in the case of motor vehicles.¹⁹⁷

Where the drawbacks of grandfathering preexisting sources by imposing less stringent (or no) controls outweigh the benefits of regulating new sources more stringently, the question arises as to how those negative effects can be reduced or eliminated. Because the old plant effect is the result of differential environmental obligations being imposed on old and new sources, it can be mitigated by decreasing the difference between the two standards. This can be achieved in one of two ways: The lower standards imposed on older sources can be raised, or the higher standards imposed on newer sources can be lowered. Since the latter option would essentially entail not implementing a new legal regime—effectively freezing the contemporary regulatory regime in place—that option is not likely to be attractive. Despite this option's lack of appeal, the new regulations are an implementation of it, as we discuss below.¹⁹⁸ Instead, limiting or eliminating the more lenient treatment of existing plants achieves a better solution to the old plant effect.

2. *The Old Plant Effect Under the Previous Statutory and Regulatory Regime.*—Congress decided under the Clean Air Act to treat existing plants more leniently than new plants.¹⁹⁹ The Act's grandfathering could have been limited significantly had it been interpreted narrowly to extend only to unmodified plants. However, since the early days of the regime, the regulatory system has provided an exception for plant modifications that constitute “routine maintenance, repair, and replacement.”²⁰⁰

¹⁹⁷ See *supra* notes 189–90 and accompanying text.

¹⁹⁸ See *infra* notes 204–06 and accompanying text.

¹⁹⁹ See *supra* Part I.A.

²⁰⁰ See *supra* notes 32–35 and accompanying text. It is arguable that this regulatory exception extends transition relief beyond the scope contemplated by the statute; to that extent, it would be undesirable (and an illegal exercise of regulatory authority, besides). Still, as we have noted above, the routine

Before the current regulations were promulgated, the regulatory regime used a case-by-case approach to decide whether a given plant modification or renovation was simply routine maintenance, repair, or replacement, or whether it went beyond that and therefore triggered new source review.²⁰¹ This case-by-case approach allowed the government to ensure that the policies underlying the routine maintenance exception were borne out in practice. While a case-by-case approach may be costly for government to administer and may create planning difficulties for societal actors, it allows government to keep a tight and reasoned constraint on grandfathering relief.

3. *The Old Plant Effect Under the New Regulations.*—The new regulations effectively subject some existing plants to more stringent regulation than others. Accordingly, they may give rise to perverse incentives in this situation as well. Specifically, the new regulations may introduce a secondary old plant effect, in addition to the old plant effect created by the preexisting grandfathering regime.

At the outset, we note an important difference between our general discussion of the old plant effect above and the applicability of the old plant effect in the context of the new regulations. Under the general discussion, we assumed that the plant owner had to choose between two options: building a new plant or retaining the existing plant in operation as-is. To evaluate the new regulations, by contrast, we must assume the plant owner has a third option: conducting substantial but not extensive improvements to the existing plant such that, under the new regulations, new source review would not be triggered. We will refer to this option as “significant improvements.”

Assuming that new plants are subject to regulation while old plants are not, the treatment of plants that undergo significant improvements can affect plant owners’ decisions as to whether to leave their existing plants in operation. Keeping with the example from the previous Subsection, say that the annual cost to *A* of a new plant is \$90 (including annualized capital cost); of an existing plant subject to significant improvements is \$95; and of an unmodified existing plant is \$100. Further assume that environmental regulations will impose an additional \$15 annual cost on a new plant but no cost on an unmodified existing plant. In this case, *A*’s ultimate decision as to how to proceed will depend upon whether the environmental regulations apply to a plant that has undergone significant improvements. If the regulations apply, then *A*’s best option is leave the existing plant in operation un-

maintenance exception has been around almost as long as the Clean Air Act itself and is usually seen as a logical implementation of the statutory grandfathering. *See id.*

²⁰¹ *See supra* notes 83–98 and accompanying text.

modified.²⁰² If, however, the regulations do not apply, as under the current regime, then *A*'s best option is instead to undertake the renovations.²⁰³

Thus, under this scenario, the new regulations remove at least part of the barrier to modernization by encouraging at least some renovations and also illustrate the old plant effect's implication that less stringent environmental regulation may achieve greater environmental protection.

There are, however, other possible scenarios under which the new regulations lead to environmentally undesirable effects. Consider a modification of the previous example under which the cost of compliance with environmental regulations is \$8 instead of \$15. Now if the environmental regulations apply to a plant that has undergone significant modifications, then *A*'s preferred option will be to construct a new plant.²⁰⁴ If the regulations do not apply, however, as under the current regime, then *A* will choose instead to modify the existing plant.²⁰⁵

Under this scenario and others like it, the new regulations will impede new construction and artificially encourage modifications that retain existing plants in operation. Under the original example, the new regulations appear to reduce a barrier to modernization. But under the revised example, the new regulations actually *erect* such a barrier. First, the regulations encourage owners to renovate existing plants rather than construct new ones. Second, in general, the regulations tend to encourage plant owners to invest comparatively smaller amounts in their plants. Indeed, because renovations that exceed twenty percent of a facility's current replacement value trigger the stringent new source standards, the new regulations tend to discourage plant owners from investing amounts greater than twenty percent.²⁰⁶

Tables 2A, 2B, 3A, and 3B help to elucidate the point. To the extent that the new regulations mitigate the old plant effect, the solution that the

²⁰² The \$100 annualized cost of that option is less than both the \$105 annualized cost of a new plant and the \$110 annualized cost of the renovated plant.

²⁰³ The \$95 annualized cost of that option is less than both the \$105 annualized cost of a new plant and the \$100 annualized cost of the existing, unmodified plant.

²⁰⁴ The \$98 annualized cost of that option is less than both the \$100 annualized cost of the existing, unmodified plant and the \$103 cost of the renovated plant.

²⁰⁵ The \$95 cost of that option is less than both the \$100 annualized cost of the existing, unmodified plant and the \$98 cost of the new plant.

²⁰⁶ Say, for example, that *A* is committed to undertake a renovation of a facility that would cost 19% of the facility's value. Undertaking simultaneous renovations costing another 6% of the facility's value may make sense if the additional renovations would result in the installation of a uniform technological standard; in other words, a 25% (by value) total investment may be economically efficient because of economies of scope. Cf. Becker & Henderson, *supra* note 188, at 383 (arguing, based upon empirical data, that "in setting up new plants or engaging in expansion of existing plants, relative to phased-in investments of the past, now plants in nonattainment areas make investments in bigger lumps (i.e., 'all at once,' relatively speaking), to avoid repeated negotiations and to ensure consistency of equipment specifications across what would have been different investment phases in the past"). The new regulations might nonetheless induce *A* to undertake only the 19% investment if the cost of complying with the stringent new source standards exceeds the benefits offered by the economies of scope.

Bush Administration's regulatory revisions invokes is the latter of the two possible solutions outlined above.²⁰⁷ By shifting some renovations from the "trigger" to the "do not trigger" side of the ledger, the new regulations provide for more lax new source review. As such, the new regulations "solve" the old plant effect problem by simply lowering the comparatively higher standard; this is reflected in Tables 2A and 2B.²⁰⁸

Table 2A: Renovations and the Trigger of New Source Review Under the Previous Regulatory Scheme, Before Enactment of the New Regulations

<i>Does Not Trigger New Source Review</i>	<i>Does Trigger New Source Review</i>
- No renovation	- Significant improvements
- Routine maintenance	- Construction of a new source

Table 2B: Renovations and the Trigger of New Source Review After the Enactment of the New Regulations

<i>Does Not Trigger New Source Review</i>	<i>Does Trigger New Source Review</i>
- No renovation	- Construction of a new source
- Routine maintenance	
- Significant improvements	

The Administration justified the new regulations by assuming that the predominant choice faced by plant owners is between undertaking a significant renovation and undertaking no renovation. This is reflected in Table 3A, with the relevant choices presented in italics. The Administration argued that, because the previous regulatory regime applied new source review to significant renovations, the previous regime encouraged plant owners to undertake no renovations.²⁰⁹ The regulatory revisions remove the disincentive to undertake significant renovations.²¹⁰

²⁰⁷ See *supra* Part I.D.

²⁰⁸ To the extent that the new regulations mitigate the old plant effect, they do so in an undesirable way. The new regulations "solve" the old plant effect problem by simply lowering the comparatively higher standard and, as we have discussed above, this is generally not an advisable solution to the problem. See *supra* notes 203–06 and accompanying text. There may be reasons to accept some degree of grandfathering and the accompanying effects, including the old plant effect. But to the extent that the government seeks to reduce the old plant effect, the answer should be to limit grandfathering, not to repeal in part or in whole the new legal regime.

²⁰⁹ See, e.g., Brian H. Potts, *Trading Grandfathered Air—A New, Simpler Approach*, 31 HARV. ENVTL. L. REV. 115, 117–18 (2007).

²¹⁰ See, e.g., Final Brief of Respondent U.S. EPA at 40–46, *New York v. EPA*, 443 F.3d 880 (D.C. Cir. 2006) (No. 03-1380) (arguing that the new regulations will create environmental benefits by encouraging those modifications that the previous new source review regime discouraged).

But the Administration misstates the problem: Given the age of the grandfathered plants, plant owners may not be choosing between undertaking significant renovations and undertaking no renovations; rather, they may be choosing between undertaking significant renovations and constructing new plants, as reflected in Table 3B. Given *that* choice, the shift of significant renovations to the “does not trigger new source review” side of the ledger serves only to encourage plant owners to undertake significant renovations instead of constructing new plants.

Table 3A: The Bush Administration’s Framing of the Choice Faced by Plant Owners (Relevant Options in Italics)

<p><i>No Renovations:</i> not subject to new source review either before or after the new regulations’ enactment</p>	<p><i>Significant Renovations:</i> subject to new source review before the new regulations’ enactment, but not after</p>	<p>Construction of a New Plant: subject to new source review both before the new regulations’ enactment and after</p>
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Table 3B: Another Possible Choice Faced by Plant Owners (Relevant Options in Italics)

<p>No Renovations: not subject to new source review either before or after the new regulations’ enactment</p>	<p><i>Significant Renovations:</i> subject to new source review before the new regulations’ enactment, but not after</p>	<p><i>Construction of a New Plant:</i> subject to new source review both before the new regulations’ enactment and after</p>
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Whether the new regulations will “solve” the old plant effect by encouraging significant renovations or act as a barrier to new construction that otherwise would and should take place depends upon which of the two scenarios presented is closer to reality. In other words, it is an empirical question. Support for the Administration’s contention—that a change to the “routine maintenance, repair, and replacement” rule is needed to remove a great disincentive to modifications—is practically nonexistent.²¹¹

²¹¹ No empirical studies to date have specifically validated the hypothesis that the EPA’s 2003 Equipment Replacement Rule standard reduces plant investment in routine upgrades or modifications at existing plants. NAT’L RESEARCH COUNCIL OF THE NAT’L ACADEMIES, INTERIM REPORT OF THE COMMITTEE ON CHANGES IN NEW SOURCE REVIEW PROGRAMS FOR STATIONARY SOURCES OF AIR POLLUTANTS 98 (2005) [hereinafter INTERIM REPORT]. Perhaps surprisingly, there is scant empirical literature on the NSR standards even prior to the 2003 rule. The EPA and industry experts have asserted that NSR requirements have in effect made certain improvements too costly to be undertaken, though there is no empirical data available to substantiate this contention.

In the EPA’s 2002 Report to the President regarding New Source Review, industry experts are cited for the proposition that the pre-Equipment Replacement Rule standard made routine maintenance and

The Administration has argued that to whatever extent the new regulations may have deleterious effects, they are on balance desirable because the efficiency benefits of having many plants upgrade outweigh the drawbacks of having unmodified plants remain in service longer.²¹² The Administration's focus thus remains on the question of efficient energy production. Missing from the Administration's account, however, is the possibility that new plants might not only be preferable from an environmental perspective but might also be able to produce energy more cheaply. There are indications that the trend in construction of new electricity-generating plants is in the direction of facilities that are both more environmentally friendly and more efficient than old plants.²¹³ If that is so, the new regulations are undesirable both from an environmental *and* an efficiency perspective.²¹⁴

The new regulations also pay insufficient attention to the history of regulation. To whatever extent the new regulations might have made some sense at an earlier regulatory stage, that regulatory history likely renders the new regulations a poor option at this point in time. The early Clean Air Act legislative history reflects a compromise to accept an extension of existing plants' lives in exchange for the application of very strict standards to the new plants that would replace them in the future.²¹⁵ More than a third of a century after that compromise was struck, many of the plants that were in existence then remain in service now—far beyond the retirement date that most initially expected, even taking into account the introduction of life-

repair “cost prohibitive to undertake, which, in turn, can adversely affect the availability and reliability of plant operations and discourage such projects.” EPA, NEW SOURCE REVIEW REPORT, *supra* note 97, at 9. In promulgating the 2003 rule, the EPA relied on anecdotal information about plant maintenance and repair projects that did not go forward because of the NSR standard since there was an absence of hard data that demonstrated that NSR disincentivized “routine maintenance, repair, and replacement” projects. OFFICE OF INSPECTOR GEN., EPA, RPT. NO. 2004-P-00034, EVALUATION REPORT: NEW SOURCE RULE CHANGE HARMS EPA'S ABILITY TO ENFORCE AGAINST COAL-FIRED ELECTRIC UTILITIES 15 (2004), available at <http://www.epa.gov/oigearth/reports/2004/20040930-2004-P-00034.pdf> [hereinafter OFFICE OF INSPECTOR GEN., EVALUATION REPORT] (citing GAO REPORT, DATA, *supra* note 111). A lack of empirical data on point may suggest an intrinsic difficulty in determining why specific “routine maintenance, repair, and replacement” projects did not move forward since NSR is one of several variables affecting a plant's choice to invest in maintenance and repair projects. INTERIM REPORT, *supra*, at 94 (“Firms and industries indicate instances when the potential to trigger NSR requirements made or might have made plant upgrades too costly to move forward. However, there is no way to independently corroborate such reports[,] and rigorous statistical studies of this phenomenon do not exist, part[ly] because the lack of data and the difficulty in identifying the effects of NSR given all the varied influences of investment decisions.”). See generally *supra* notes 184–91 and accompanying text (discussing empirical studies).

²¹² See, e.g., Final Brief of Respondent U.S. EPA, *supra* note 210, at 68–89. The Administration also argued that in fact the proposed twenty percent safe harbor would not result in an emissions increase on a nationwide basis. See *id.* at 89–99.

²¹³ Swift, *supra* note 184, at 376–77.

²¹⁴ See *infra* note 227 and accompanying text (discussing the flawed, yet typical, government approach of emphasizing the ancillary costs of additional regulation over the ancillary benefits).

²¹⁵ See *supra* Part I.A.

extending differential regulatory standards.²¹⁶ In effect, we are now at the stage—indeed, often beyond the stage—where one reasonably might expect the grandfathered plants to be retired.²¹⁷ One would expect the annual cost of a newly constructed plant to be less than the annual cost of a grandfathered plant, even taking into account the far more stringent environmental standards imposed on new plants.²¹⁸

The incentive to retain older power plants in operation is especially problematic. Old coal-burning electricity-generating power plants—located predominantly in the midwestern United States—generate a disproportionately large amount of pollution.²¹⁹ In particular, these plants are largely responsible for the problem of acid precipitation in the northeastern United States and eastern Canada.²²⁰ Thus, the environmental impact of keeping those plants in operation over a longer period of time is especially dramatic.

The incentive to keep older plants in operation even longer than under the previous regime is not the only poor incentive that the new regulations might generate. The next Section explores other undesirable investment incentives that the new regulations might create.

B. *The New Regulations' Effects on Investment Decisions*

One portion of the revisions to the new source review regulations—the twenty percent regulatory safe harbor—would have predictable, and undesirable, effects on plant owners' investment decisions by erecting a barrier to modernization. We briefly survey these effects in this Section. First, as

²¹⁶ See *supra* Part I.D.

²¹⁷ See Potts, *supra* note 209, at 153 (“[Fifty-seven percent] of all fossil-fuel units (1,396 total units) [operating] in 2000 were built before the Clean Air Act was adopted in 1972.” (citing U.S. GEN. ACCOUNTING OFFICE (GAO), AIR POLLUTION EMISSIONS FROM OLDER ELECTRIC-GENERATING UNITS 3 (2002), available at <http://www.gao.gov/new.items/d02709.pdf>)).

²¹⁸ Put another way, the new regulations are inefficient because they draw a bright regulatory line between two options—renovating an existing facility and constructing a new one—that are, at this juncture, economically close substitutes. As David Weisbach has elucidated in the context of anti-tax-avoidance legislation, regulatory line-drawing between close substitutes is inefficient since the bright regulatory line is more likely to induce change in behavior that is undesirable. David A. Weisbach, *An Economic Analysis of Anti-Tax-Avoidance Doctrines*, 4 AM. L. & ECON. REV. 88, 96–99 (2002). In particular, given a choice between two close substitutes, only one of which is subject to regulation, societal actors are likely to choose the option that is free of regulation. *Id.*; see David A. Weisbach, *An Efficiency Analysis of Line Drawing in the Tax Law*, 29 J. LEG. STUD. 71, 74–79 (2000). In the context of environmental regulation, modifying an existing facility is (today) likely to be a close substitute for constructing a new facility. Thus, drawing a line between modification and new construction will encourage actors to avoid the regulated option—new construction—in favor of modification.

²¹⁹ See, e.g., David R. Wooley, *Environmental Comparability*, 12 NAT. RESOURCES & ENV'T 276, 276 (1998) (“The pollution problems of electricity in the United States arise from the emissions of a few hundred antiquated power plants.”); *id.* at 278 (“Metals and CO₂ emissions are dramatically higher from older, inefficient power stations. Older plants often have poor heat-to-electricity conversion efficiencies, resulting in much larger fuel consumption and pollution emitted per unit of power generated.”).

²²⁰ See Jonathan Remy Nash & Richard L. Revesz, *Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants*, 28 ECOLOGY L.Q. 569, 587 (2001).

we discuss above, the new regulations may encourage plant owners not to invest funds in renovation that would cross the threshold and trigger the stringent new source standards.²²¹

Second, the regulations, or the EPA's stated internal policy following the District of Columbia Circuit's rejection of the twenty percent safe harbor, may encourage plant owners to structure investments as a series of smaller-scale investments—even though one large-scale renovation would be economically preferable—simply to avoid the more stringent new source standards.²²² By way of example, say that *A* has decided to undertake renovations to a plant that will cost thirty percent of the value of the plant. *A* could structure the renovations in two stages, but this would add to the cost of the renovations—for example, because workers must come to the plant twice and perhaps duplicate some work that otherwise would be done only once—such that the cost of each stage of the bifurcated renovations would be nineteen percent of the value of the facility. The one-time renovation is clearly the more efficient option. But the new regulations might induce *A* to undertake the two-stage approach if the cost of complying with the stringent new source standard exceeded the eight percent additional cost that bifurcation would impose.²²³

The Administration could attempt to treat related renovations as a single renovation for purposes of the safe harbor rule. Thus, two related fifteen percent renovations would count as a single thirty percent renovation that would trigger new source review. Such standards, however, are notoriously difficult to administer because they present the obvious question of how to define which renovations are “related.” And a great deal of the benefits of certainty that the Administration attributes to its new regulations would be lost.²²⁴

²²¹ See *supra* notes 201–14 and accompanying text.

²²² See Shi-Ling Hsu, *What's Old is New: The Problem with New Source Review*, 29 REG. 36, 40 (2006) (“[P]lant owners will almost certainly find ingenious ways to gradually update their plants in increments costing less than [twenty] percent of the original plant cost.”).

²²³ Empirical data supports the hypothesis that the structure of environmental regulation might affect the long term structuring of plant investment decisions. Cf. Becker & Henderson, *supra* note 188, at 415–16 (“Investment or growth patterns of plants appear to be affected by regulation. In particular, relative to attainment areas, new plants subject to strong regulation in nonattainment areas start off significantly larger (more up-front investment), but over time (within 10 years) their sizes converge to those of plants in attainment areas (with more phased-in investments).”).

²²⁴ We further note that even if the aggregation standard is effectively enforced, the question arises as to whether the costs of enforcement—in terms of both monitoring and litigation costs—would outweigh the purported benefits of the rule, which include greater certainty for societal actors. The Bush Administration advances the notion that one cost that the current regulatory system imposes—and, accordingly, one cost that its safe harbor would eliminate—is the uncertainty inherent in the case-by-case approach. See *supra* notes 110–12 and accompanying text.

Indeed, the application of a case-by-case standard may, as a general matter, make it easier for societal actors to predict how the law will be applied in the future. See Louis Kaplow, *Rules Versus Standards: An Economic Analysis*, 42 DUKE L.J. 557, 575–76 (1992) (describing the paradigmatic situation—one among three possibilities—where individual actors become informed of the law under a

Moreover, it may make sense, once one has decided to undertake a large renovation, to take advantage of economies of scope and replace even more plant elements than the basic renovation requires.²²⁵ Consider the possibility that a part in an old, grandfathered power-generating plant dates from the original construction of the plant. The part is responsible for shutting down the plant and taking it off the regional power grid in the event of a plant overload. A modern version of the part (perhaps it is electronic whereas the original part is mechanical) might help to avoid local or even large-scale blackouts. In the context of a large-scale renovation, the plant owner may decide to replace the part even though the part is functioning well at the moment, simply because the renovation of the entire unit provides an opportune time to replace the part. In contrast, the part might not be replaced in the smaller renovation that results because of the twenty-percent rule; the rule therefore might preclude realizing the ancillary benefits of avoiding power outages.²²⁶

III. INTERACTION WITH OTHER PROVISIONS OF THE CLEAN AIR ACT

The new regulations effectively dilute the environmental standards that govern existing plants. The Administration justified this strategy on grounds of economic efficiency.²²⁷ But the Administration fails to recognize the ways in which the new regulations will interact with other Clean Air Act regulations. Because of these interconnections, the new regulations will impose more stringent regulation on sources beyond those that undertake renovations. This effect will increase the costs of the new regulations and will also distribute those costs in an undesirable manner.

The Clean Air Act establishes national primary and secondary ambient air quality standards (NAAQS) to guard against adverse effects on public

rule but not a standard). This may provide a benefit in that actors who fear uncertainty may be more likely to take desirable actions under a rule than a standard.

But even assuming that the uncertainty imposes substantial costs, the Administration fails to take notice of the uncertainty that the new regulations would introduce. From the description in the new regulation, the question whether to aggregate multiple modifications would be governed by a standard, not a rule. As such, it seems likely to generate substantial enforcement, monitoring, and litigation costs. Compare the somewhat analogous step transaction doctrine under the tax law. *See, e.g.*, Cliff Gross, *An Overview of U.S. Federal Tax Considerations Regarding Taxable and Tax-Free Corporate Acquisition Structures*, in 9 TAX STRATEGIES FOR CORPORATE ACQUISITIONS, DISPOSITIONS, SPIN-OFFS, JOINT VENTURES, FINANCINGS, REORGANIZATIONS & RESTRUCTURINGS 777, 794 (PLI Tax Law & Estate Planning Course Handbook Series No. 2995, 2004) (noting that application of the step transaction doctrine “is often difficult to predict reliably”).

²²⁵ We are grateful to Professor Ross Baldick for suggesting this idea.

²²⁶ *See generally* Samuel J. Rascoff & Richard L. Revesz, *The Biases of Risk Tradeoff Analysis: Towards Parity in Environmental and Health-and-Safety Regulation*, 69 U. CHI. L. REV. 1763, 1769–80 (2002) (discussing various forms of risk tradeoff analysis). *See also id.* at 1790–95 (describing the familiar, but flawed, pattern of the government considering ancillary costs but not ancillary benefits of additional regulation); *see also* Nash, *supra* note 195, at 511–15.

²²⁷ *See supra* notes 208–10.

health and public welfare, respectively.²²⁸ The NAAQS themselves are, as their name indicates, simply ambient standards; they do not, by themselves, regulate the pollution emissions at any one source (or group of sources). Still, the promulgation of NAAQS ultimately constrains the emissions of pollutants.²²⁹

It stands to reason that, for the NAAQS to hold, a dilution of the standard applied to one set of sources will require the imposition of a comparatively stricter standard on another set of sources. Indeed, the Clean Air Act designates those counties where air quality does not equal or surpass the NAAQS as nonattainment areas,²³⁰ and imposes tight constraints on the construction and operation of new sources in such areas.²³¹ One of the many requirements that a new source must satisfy in a nonattainment area is that the new source must obtain offsetting reductions in emissions from existing sources such that, in total, reasonable further progress is made toward attainment of the NAAQS.²³² Nonattainment thus constrains the ability of new sources to locate in an area. In fact, to the extent that offsets are prohibitively expensive, the constraint may be absolute.

This notion—that, because of the constraints imposed by the NAAQS, grandfathering requires that comparatively stricter standards be applied to other sources—plays itself out in the context of two pairs of sets of sources. Consider first the effect of grandfathering existing sources on new sources in the same area. By imposing less stringent standards on existing sources, the Act makes it likely that comparatively more stringent standards will be imposed on new sources to meet the NAAQS.²³³ The new regulations further reduce the stringency of the existing source standards by allowing more renovations and repairs without triggering new source review. Even stricter standards on new sources would then be necessary in order to meet the NAAQS.²³⁴

²²⁸ See generally Clean Air Act, 42 U.S.C. § 7409(b) (2000).

²²⁹ The Clean Air Act vests the states with authority to develop state implementation plans (SIPs) that are designed to achieve the NAAQS. See *id.* § 7410(a). While the Act grants states the discretion to decide *how* the NAAQS are to be achieved, see, e.g., *Union Elec. Co. v. EPA*, 427 U.S. 246, 256–57 (1976) (“The Amendments place the primary responsibility for formulating pollution control strategies on the States.”), at some point compliance with NAAQS for a pollutant must involve some limit on the total amount of the pollutant that can be released over some period of time. In other words, there is some amount of the pollutant such that, if that much of the pollutant is released over a period of time, the NAAQS cannot be met.

²³⁰ See 42 U.S.C. § 7407(b)(1).

²³¹ See *id.* §§ 7501–09(a).

²³² See *id.* §§ 7502(c)(5), 7503(a)(1).

²³³ It is conceivable that a state might, on its own, choose to regulate existing sources quite stringently under an SIP. But it would seem likely that greater lobbying access and power would be wielded by existing sources, with the likely result being that existing sources would enjoy the grandfathering the federal Act affords and in fact be regulated less stringently. See Keohane et al., *supra* note 183, at 315.

²³⁴ That is not to say that there is a zero-sum game. Pollution concentration will depend upon the characteristics and locations of pollution emissions; in particular, the location and extent of harm ulti-

Alternatively, the effect of more liberal grandfathering could be to prevent the siting of new sources in nonattainment areas. The existence of grandfathered plants that contributes to an area's nonattainment²³⁵ may preclude the siting of new plants in that area, when in fact it would be more efficient to allow the new sources to begin operation and either discontinue or scale back the old plants' operations, or otherwise reduce the old plants' pollution outputs.

Second, the imposition of a less stringent standard on existing sources in one state may impose a comparatively more stringent standard on—or, more likely, impede the siting of—sources in another, downwind state. The presence of polluting facilities in one state may have considerable adverse effects on the ambient pollution levels in another, downwind state.²³⁶ The influx of pollution from sources in an upwind state may compel the downwind state,²³⁷ in designing a state implementation plan that will result in NAAQS compliance,²³⁸ to impose more stringent and additional constraints on the sources within its borders.²³⁹

In both cases, then, some sources—new in-state sources and sources in downwind states—will be regulated more heavily while existing sources substantially escape regulation. It is generally the case that the marginal

mately caused by pollution emissions will depend, *inter alia*, upon location, wind patterns, topography, smokestack height, emissions velocity, and emissions temperature. *See* Nash & Revesz, *supra* note 220, at 577–78. Nonetheless, it remains the case generally to expect the increased pollutant concentrations that will result from a less stringent standard being imposed on some sources to be offset by decreased pollution concentrations resulting from a more stringent standard imposed on other sources, if overall pollutant concentrations are not to worsen.

²³⁵ We say “existence” and not “presence of grandfathered plants in the area” because emissions from a grandfathered plant in a location geographically far from the nonattainment area may travel to the area and contribute to the area's nonattainment status. *See id.* at 576 (discussing “regional pollutants”).

²³⁶ *Id.* at 576 (discussing the reach of regional pollutants); *id.* at 587 (discussing the regional impact of sulfur dioxide emissions in the United States).

²³⁷ The Act, by its terms, requires upwind states to include in their SIPs proscriptions against emitting pollutants in amounts that will either “contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary ambient air quality standard, or . . . interfere with measures required to be included in the applicable implementation plan for any other State . . . to prevent significant deterioration of air quality or to protect visibility” 42 U.S.C. § 7410(a)(2)(D)(i). It also authorizes downwind states to petition the EPA for relief when emissions from a source, or group of sources, in an upwind state are causing such results. *Id.* § 7426(b). However, even if such relief is ultimately forthcoming, it can take considerable time to arrive. *See, e.g.,* Appalachian Power Co. v. EPA, 249 F.3d 1032 (D.C. Cir. 2001) (responding to a petition filed in 1997); Michigan v. EPA, 213 F.3d 663, 669–70 (D.C. Cir. 2000) (upholding SIP call issued in 1998). Thus, in practice, the upwind pollution may have a constraining effect on downwind sources over an extended time horizon.

²³⁸ The Act leaves it to states to develop and implement SIPs that will achieve NAAQS compliance. *See supra* note 229.

²³⁹ Indeed, this conflict of interest over new source review between upwind and downwind states is evidenced by the fact that fifteen states, mostly from the northeastern United States, filed suit against the EPA, challenging the new rule, while fourteen midwestern and western states intervened on the EPA's behalf. *See* New York v. EPA, 443 F.3d 880, 881–82 (D.C. Cir. 2006).

costs of pollution reduction rise steeply as a source increases its pollution control: Regulating a source more stringently imposes higher marginal costs.²⁴⁰ It is therefore likely to be economically inefficient for the new rules to regulate some sources stringently while allowing others to substantially escape regulation. The burden of pollution reduction would be more economically efficient if it were spread more evenly across sources.

Moreover, there are likely to be cross-industry siting effects. The NAAQS apply uniformly on the basis of geography. Thus, to the extent that the existence of grandfathered plants contributes to an area's nonattainment status, the effect of that classification is not restricted to the siting of new plants in the same industry as the grandfathered plants. Rather, the effect may extend to plants used in other industries that emit the same pollutant. Thus, the resulting inefficiencies may be quite extensive.²⁴¹

²⁴⁰ See, e.g., Daniel H. Cole & Peter Z. Grossman, *When is Command-and-Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection*, 1999 WIS. L. REV. 887, 916–17 (noting that the academic prediction and the empirical evidence tend to confirm that marginal pollution control costs rise steeply as the levels of control rise).

²⁴¹ In addition to the inefficiencies with existing law discussed in the text, much of the benefit that the Administration attributes to the new regulations is already available under the EPA's bubble policy. Moreover, to the extent the new regulations extend relief beyond the bubble policy, they do so in an undesirable way.

The bubble policy interprets the term "stationary source" in the statutory definition of "modification," 42 U.S.C. § 7411(a)(4), and allows plant owners to treat multiple point sources of pollution as a single source. See EPA Emissions Trading Policy Statement, 51 Fed. Reg. 43,814 (Dec. 4, 1986). For discussion of the history of the bubble program, see Michael C. Naughton, Note, *Establishing Interstate Markets for Emissions Trading of Ozone Precursors: The Case of the Northeast Ozone Transport Commission and the Northeast States for Coordinated Air Use Management Emissions Trading Proposals*, 3 N.Y.U. ENVTL. L.J. 195, 210–13 (1994).

The bubble policy effectively allows a plant owner to renovate a facility and increase the amount of pollution emitted without triggering new source review, provided that the group of sources that lie "under the bubble" do not exhibit an overall net increase in emissions. In other words, an increase in emissions at a renovated source can be offset by a reduction at another source under the bubble, such that the renovation will not trigger new source review.

The bubble policy is especially valuable for owners of sources located in nonattainment areas and areas subject to the PSD program. (The PSD program seeks to avoid decreases in air quality in areas in which existing air quality is already, or should be, pristine, i.e., in excess of the NAAQS. See 42 U.S.C. §§ 7471–79.)

Both programs impose strict requirements on new sources located in the areas they govern. The nonattainment program requires, for example, offsetting emissions reductions and that the new source comply with the lowest achievable emissions rate. See *id.* §§ 7502(c)(5), 7503(a)(1)–(2). The PSD program requires that new sources receive a permit and employ the best available control technology for pollution reduction. See *id.* § 7475(a)(1), (4).

These programs adopt the same definition of modification for purposes of their new source review provisions. See *id.* § 7501(4) ("For the purpose of th[e] [nonattainment program] . . . [t]he terms 'modifications' and 'modified' mean the same as the term 'modification' as used in section [7411(a)(4)] of this title."); *id.* § 7479(2)(C) ("For the purpose of th[e] [PSD program] . . . [t]he term 'construction' when used in connection with any source or facility, includes the modification (as defined in section [7411(a)] of this title) of any source or facility."). Because they do so, the benefit of the bubble policy

IV. THE NEW RULES AS TRANSITION RELIEF

Grandfathering of existing sources is a form of relief from a new, more stringent legal regime. As such, the propriety of grandfathering is a subpart of the more general question of how best to effect a transition from one legal regime to another. In this Part, we describe the debate over new source review that addresses the legal and economic aspects of legal transitions. We explain the literature's general presumption against transition relief. Then, in evaluating the new regulations as a form of transition relief, we explore their incentive and fairness effects. Considerations of incentive effects generally militate against legal transition relief. Moreover, even if incentive effects might justify some limited transition relief here, the new regulations far exceed any appropriate transition relief. And, similarly, to whatever extent concerns of fairness might justify limited transition relief, the new regulations go beyond what fairness demands.

A. *Grandfathering and the New Regulations as Transition Relief*

Grandfathering is a form of transition relief. Not applying a new legal rule to existing actors shields those actors from the new legal regime.²⁴²

Transition policy can provide different degrees of relief from the new legal regime. At one extreme is a transition policy that offers no special treatment whatsoever. The other extreme is a policy that offers full relief—for example, a policy of permanent grandfathering or a policy of full compensation for the cost of complying with the new regulatory standards. In between the two extremes are policies, like limited grandfathering, that offer partial relief.²⁴³ The grandfathering under the Clean Air Act is a form of partial relief, insofar as it applies only to existing sources until they undertake modifications.

The new regulations would first give firms more flexibility in determining the baselines against which emissions increases are measured,

to owners of plants located in nonattainment and PSD areas is even greater. *See, e.g.*, *Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984) (upholding the use of the bubble policy to avoid nonattainment new source review); *Ala. Power Co. v. Costle*, 636 F.2d 323 (D.C. Cir. 1979) (upholding the use of the bubble policy to avoid PSD new source review).

In light of the bubble policy, a modification that results in an increase in emissions does not trigger new source review if it is bubbled with another source that undergoes an offsetting decrease in emissions. Thus, the only additional benefit that the new regulations seem to provide is for renovations that would result in increased pollution output and that are not offset by pollution reductions at other sources. While the quantity of this benefit is unclear, it is in any event substantially less than it would be in the absence of the bubble policy.

²⁴² *See* Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509, 584–87 (1986) [hereinafter Kaplow, *Legal Transitions*] (discussing grandfather provisions as an example of legal transition relief).

²⁴³ For a detailed examination of different types of partial transition relief, see *id.* at 582–92; Louis Kaplow, *Transition Policy: A Conceptual Framework*, 13 J. CONTEMP. LEGAL ISSUES 161, 186–87 (2003) [hereinafter Kaplow, *Transition Policy*].

shielding additional sources from new source review.²⁴⁴ The new regulations would also graft a safe harbor onto the case-by-case examination of modifications of pollution sources.²⁴⁵ The safe harbor would extend transition relief beyond the scope authorized by the previous regime.²⁴⁶ Thus, the new regulations would extend greater transition relief than was previously available.

B. Incentive Effects

Given that grandfathering in general, and the new revisions to the regulations in particular, are examples of transition relief, it is appropriate to consider the extent to which legal transition relief is ever justified. As we discuss in this Section, rules of legal transition relief are generally inadvisable because they give rise to poor incentives: They discourage actors from anticipating changes in legal rules, and they encourage actors to seek economic rents from transition relief regimes. Moreover, to whatever extent the possible benefits of transition relief outweigh the costs associated with these incentive effects, limited transition relief may be justified. The new regulations, however, far exceed whatever the justifiable level of transition relief might be.

First, relief from a transition in legal regimes is ordinarily inadvisable because it creates an incentive for societal actors not to anticipate changes in the governing law. As a general matter, societal actors are not afforded public relief from change.²⁴⁷ For example, a firm that uses a particular technology in its production process runs the risk that the technology will change. If that happens, the firm may lose profits and perhaps go out of business altogether if it does not modernize its production process; no legal

²⁴⁴ See *supra* notes 118–25 and accompanying text.

²⁴⁵ See *supra* notes 146–51 and accompanying text.

²⁴⁶ To see this, note first that the set of renovations that will not trigger new source review under the new regulations cannot be smaller than the set that would not trigger such review absent these regulations. In terms of set theory, let A equal the set of renovations that can be undertaken without triggering new source review under the existing regulatory scheme, and let B equal the set of renovations that can be undertaken without triggering new source review under the safe harbor. Because the Administration would have its safe harbor function in addition to the existing regulations, the complete set of renovations that could be undertaken without triggering new source review, under the regulatory scheme after the addition of the new regulations, would be represented by $A \cup B$. And necessarily, $A \subseteq A \cup B$.

There is reason, moreover, to expect the latter set to be larger. First, the twenty percent limit in the regulation seems, at first blush at least, rather high. Further, the addition of a safe harbor—even a safe harbor with a comparatively low percentage limit—would be expected to augment, if marginally, the set of renovations that will not trigger new source review. Adhering to set theory, the only way it can be that $A = A \cup B$ is if $B \subseteq A$, i.e., if every renovation that is shielded from new source review under the safe harbor was already shielded from new source review under the existing regulatory structure.

Indeed, it would be surprising if the safe harbor proposal did *not* allow for more renovations to be undertaken insofar as that was one of the Administration's justifications for proposing the rule in the first place. See *supra* notes 147–53 and accompanying text.

²⁴⁷ Private relief in the form of insurance may be available.

relief shields the firm from the market pressure to adopt the technological change.

The possibility of a change in legal regime is simply a subclass of the larger set of risks that societal actors face. In general, the government does not provide protection against such risks. Absent special justification, a change in legal regime should be treated similarly to other types of changes societal actors face.²⁴⁸ Thus, as a general rule, legal transition relief is undesirable.²⁴⁹ The prospect of transition relief inefficiently discourages actors from anticipating legal change. In contrast, placing the risk of legal change on societal actors encourages them to anticipate legal change and to comply voluntarily and in advance.²⁵⁰ Societal actors who are governed by one legal regime and who foresee a coming change in that regime will be less likely to conform voluntarily to that change if they also foresee a likelihood that the government will afford them transition relief from it. Moreover, when the government enacts a new legal regime with transition relief, it sends a signal to society at large that, in general, changes in legal standards will not govern existing actors. Actors who lie beyond the scope of the particular regime will be less likely to anticipate or to comply voluntarily with new legal standards in the regime that governs their own behavior.

In light of the general undesirability of transition relief, the broader the transition relief, the more problematic it is. Narrower transition relief gives rise to undesirable incentives in a smaller set of societal actors than does broader transition relief. The grandfathering currently in effect is a form of partial transition relief. The new regulations would expand the scope of partial transition relief and would therefore be even less desirable under this analysis.

This incentives-based justification for the general presumption against transition relief—that the absence of transition relief creates an incentive to anticipate changes in the legal regime—is applicable to environmental regulation. Generally, it is beneficial to have societal actors anticipate, and voluntarily comply with, coming changes in the legal landscape. And it hardly

²⁴⁸ See Kaplow, *Legal Transitions*, *supra* note 242, at 522–36 (showing that “government-created risk . . . is little different from market-created risk, when viewed from an economic perspective”).

²⁴⁹ See *id.* at 520–21 (arguing that “transitional relief disturbs rather than corrects a properly functioning market”). See generally Kaplow, *Transition Policy*, *supra* note 243 (developing a more balanced framework for assessing transition gains and losses). In reaching this conclusion, Kaplow relies upon two basic assumptions: that “the transition policy to be employed in a given context is well-known in advance and will be followed consistently in the future,” Kaplow, *Legal Transitions*, *supra* note 242, at 520, and that the legal reforms in question are “desirable at the time they are made,” *id.* at 521.

²⁵⁰ See Saul Levmore, *Changes, Anticipations, and Reparations*, 99 COLUM. L. REV. 1657, 1662–63 (1999) (arguing that “it will pay for firms to anticipate government regulation in order to avoid liability or wasted investments”).

seems unreasonable to expect industrial sources, such as those subject to new source review, to anticipate legal change.²⁵¹

One might argue that the incentive to anticipate legal change can be excessive in some cases. For example, an actor who foresees a change in technology and installs that technology might find that technology was about to advance again.²⁵² Depending upon the cost of replacing old equipment with new and the rate at which technology is advancing, plant owners might rationally decide that it is too costly to comply with all technological changes, even ones that they anticipate.²⁵³

To remedy this situation, grandfathering may be desirable where precautionary investments are “durable” for some period of time, and especially where the cost of including pollution control technology in new

²⁵¹ To the extent that the justification not to grant transition relief is to create an incentive for societal actors to anticipate changes in the law, one must assume that those actors in fact reasonably can anticipate such changes. In effect, the rule against transition relief assumes that actors will have the capacity to anticipate, and act rationally in the face of, changes in legal regimes. See generally Kyle D. Logue, *Legal Transitions, Rational Expectations, and Legal Process*, 13 J. CONTEMP. LEGAL ISSUES 211, 214 (2003) (arguing that this assumption is most valid in transitions that “involve[] (or ha[ve] the characteristics of) incremental changes in the common law”). While this assumption is not universally valid, it seems most likely to be true for sophisticated actors, especially corporations. *Id.* at 229–30. For better or for worse, environmental regulation tends to focus on industrial polluters. Cf. Nash, *supra* note 195, at 476 n.31 (arguing that it is often debatable who the actual “polluter” is); Dale B. Thompson, *Political Obstacles to the Implementation of Emissions Markets: Lessons from RECLAIM*, 40 NAT. RESOURCES J. 645, 686–87 (2000) (discussing the practical difficulties of subjecting individuals to environmental regulation); Ann E. Carlson, *Recycling Norms*, 89 CAL. L. REV. 1231, 1295–1300 (2001) (to similar effect). But see Michael P. Vandenberg, *Order Without Social Norms: How Personal Norm Activation Can Protect the Environment*, 99 NW. U. L. REV. 1101, 1116–29 (2005) (arguing that “release reporting can be directed at individual behavior in a way that will effectively . . . provide the types of information necessary to activate norms,” which will “begin the process of changing direct and civic individual behavior”). And as a general matter, industrial polluters tend to be corporations, often sizable corporations, and often of considerable sophistication—in other words, precisely the type of societal actors one would expect to be best able to anticipate changes in the legal regime.

²⁵² The general analytic framework that frowns upon transition relief assumes that, once the legal standard (whether the new rule or the rule that offers transition relief) is set, societal actors comply with the standard once and then a fortiori remain in compliance until the standard is changed. In other words, the framework assumes that compliance with the standard is not a constantly moving target but is instead aptly characterized as subject to punctuated equilibrium.

But this need not be the case and, in fact, is often not the case in environmental regulation. The dominant form of environmental regulation is command-and-control regulation that requires compliance with particular technological standards in order to satisfy the statutory and regulatory commands. Thus, the Clean Water Act requires that sources employ the “best available technology economically achievable” for toxic pollutants. Clean Water Act, 33 U.S.C. § 1311(b)(2)(A) (2000). But while federal environmental laws often set a technological standard that remains constant over an extended period of time, the level of technology that constitutes the best available technology varies much more frequently because technology evolves. For example, the Clean Air Act’s mandate that the “best available technology” be used may be clear and may remain unchanged over an extended time horizon, but the level of technology that satisfies that legal standard is likely to, and indeed does, vary.

²⁵³ One also might argue that it is unfair to require actors who have just completed complying with the then-current standard to once again undertake costly compliance with a new standard. We elucidate this point in the next Section. See *infra* Part IV.C.

plants is far less than the cost of installing such technology in existing plants. Thus, for example, assuming that statutes and regulations mandate particular technologies, it may make sense to protect societal actors who comply with the current mandatory technology level against changes in the technology level, at least for some reasonable period of time. In other words, the statute or regulation might provide for delayed implementation or phase-in of the new technology level, based presumably upon the actors' reasonable investment expectations. This would retain at least some incentive for actors to anticipate changes in legal regime because an actor who voluntarily installed an advanced control system, which she anticipated would soon be required by law, would also be protected from further changes in the law for a reasonable period of time into the future. Such a system of time-limited transition relief would be superior to full grandfathering. Because the effects of the transition relief would be time-limited, all sources would eventually fall under the new standards.

The Clean Water Act to some extent implements this idea. The Act provides that if new standards for point sources are adopted within a ten-year "protection period," the source can attain a National Pollutant Discharge Elimination System (NPDES) permit which will exempt the source from complying with the newer standards.²⁵⁴

Even if such limited transition relief might be warranted under appropriate circumstances, the new regulations do not pass muster. First, grandfathering under the Clean Air Act provides protection from new standards even in the absence of new investment. Relief might have been limited to those plants with then-state-of-the-art pollution control equipment installed shortly before the enactment of the 1970 Clean Air Act Amendments. But, instead, the grandfathering applies across-the-board to all preexisting plants. In other words, the grandfathering regime provides no incentive to anticipate legal change at all.

The new regulations exacerbate this problem by shielding more modifications from new source review. The plants that benefit from these regulations have already enjoyed the benefits of grandfathering without the need to make any investment in anticipation of legal change. Moreover, plants will invest in modifications not because they anticipate a shift in the legal regime but rather because they are confident that they will not be subject to the new source standards. Unlike the safe harbor in the Clean Water Act, the new regulations provide protection even in the absence of new investment to comply with the new source standards. As such, the new regulations do not promote desirable incentive effects.²⁵⁵

Second, the new regulations extend indefinite relief. Once again, even the original grandfathering of existing sources as structured under the Clean

²⁵⁴ See 33 U.S.C. § 1316(d); 40 C.F.R. § 122.29(d)(1) (2006).

²⁵⁵ See Steven Shavell, *On Optimal Legal Change, Past Behavior, and Grandfathering* 3, 26–27 (Harvard Law & Econ. Discussion Paper No. 570, 2006), available at <http://ssrn.com/abstract=956819>.

Air Act is not reasonable by this measure. The extent to which transition relief would be available into the future could have been limited. But the preexisting grandfathering is not time-limited; in theory at least, it can continue indefinitely.

The new regulations exacerbate this problem by expanding the set of renovations and modifications that can be undertaken without triggering new source review.²⁵⁶ Thus, the new regulations increase the ability of sources that have already enjoyed grandfathering to enjoy the benefits of grandfathering over an even longer period of time. In short, the new regulations only entrench and intensify the indefinite incentive the Clean Air Act introduced for industry actors not to anticipate changes in the governing legal regime.

Transition relief is also inadvisable to the extent that it generally gives rise to a second type of undesirable incentive: an incentive for existing actors to try to preserve and extend transition relief so they can continue to extract the economic rents it creates. Rent-seeking occurs when societal actors invest time and effort to secure regulation that generates economic rents.²⁵⁷ Because it involves private actors using public authority to generate private gains, rent-seeking is generally seen as undesirable.²⁵⁸ Not only will groups inefficiently devote resources to obtain rent-generating regulations, but, once such regulations are in place, groups have the incentive to lobby to keep the regulations in place, to expand them, and to extend their lives.

Environmental grandfathering legislation and regulations produce rent for existing market participants. Grandfathering generates rent in the form of barriers to entry that protect existing industry actors from prospective competitors.²⁵⁹ These barriers to entry impose higher costs on prospective market entrants, thus allowing existing actors access to greater profits.²⁶⁰

²⁵⁶ See *supra* Part I.D; Hsu, *supra* note 182, at 10,100 (“An enormous fraction of common repair and replacement activities can be accomplished for less than 20% of the original plant construction cost, and for those that typically cost more, plant owners will almost certainly find ingenious ways to gradually upgrade their plants in increments costing less than 20% of the original plant cost. . . . [Thus, the 20% safe harbor rule would] virtually guarantee[] that [New Source Review] will be never be triggered.” (footnote omitted)).

²⁵⁷ See generally Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 W. ECON. J. 224 (1967).

²⁵⁸ See *id.* at 226.

²⁵⁹ See Keohane et al., *supra* note 183, at 348–51; see also Hsu, *supra* note 222, at 42 (characterizing grandfathering in the context of new source review as an “invitation to rent-seeking”).

²⁶⁰ See Keohane et al., *supra* note 183, at 349–50 (“[F]irms regulated by a rentgenerating instrument, such as command-and-control standards, will benefit if that instrument is linked to a mechanism that imposes barriers to entry. In theory, such a mechanism might prohibit new entry outright; a more politically feasible approach would impose higher costs on new entrants.”); Robert D. Tollison, *Public Choice and Legislation*, 74 VA. L. REV. 339, 367 (1988) (“[O]ne of the more interesting examples of the interest-group theory in the literature pits high-cost firms against low-cost firms in an industry. The lat-

Insofar as the new regulations would expand the grandfathering regime, industry support for the new regulations is evidence of the incentive for existing industry actors to act to keep their competitive advantage intact and indeed to expand it.²⁶¹

From a political economy perspective, it may be that in order to attain sufficient legislative and executive support to implement any change to the existing legal regime, some form of transition relief may be necessary as a compromise.²⁶² As Saul Levmore puts it, the compromise entails the compensation of politically powerful losers by winners under the new policy in the form of rents generated by transition relief.²⁶³ To the extent that no change to the existing regime is possible otherwise, it may be that change to the legal regime in combination with transition relief is the best attainable outcome.²⁶⁴

Even accepting this premise, however, “compromise” is not a justification for the new regulations. The new regulations merely extend existing transition relief; transition relief is not coupled with the enactment of more stringent prospective regulations. In Levmore’s terms, there is no reason beyond pure lobbying power to compensate the politically powerful in this setting. Society gains no benefit in return for the extension of additional grandfathering.

C. Fairness

In the previous Section, we discussed the deleterious incentive effects presented by the new regulations. In this Section, we consider concerns of fairness. We conclude that even if fairness might justify limited transition relief in certain situations, fairness provides no basis for the new regulations’ extension of transition relief.²⁶⁵

In addition to the argument that incentive effects might warrant extending limited transition relief to actors who voluntarily comply with impending legal change,²⁶⁶ one can argue that it is unfair to require actors who have

ter firms seek cost-increasing regulations that drive some of the former firms out of the industry, raise industry price, and increase the quasi-rents accruing to the low-cost firms.”)

²⁶¹ Cf. Keohane et al., *supra* note 183, at 350 (“Although the theoretical arguments are strong, there are no conclusive empirical validations of these demand-side propositions. Direct empirical tests of firm demand for regulatory instruments (such as analyses of resources devoted to lobbying for such instruments as a function of firms’ stakes in an issue) are virtually nonexistent. Instead, most empirical work in this area simply seeks to measure the benefits an industry receives under regulation. Thus, the work examines not instrument demand itself, but rather the presumed product of such demand.”).

²⁶² Kaplow, *Legal Transitions*, *supra* note 242, at 571–72.

²⁶³ Levmore, *supra* note 250, at 1665–66.

²⁶⁴ *Id.*

²⁶⁵ Cf. Kaplow, *Legal Transitions*, *supra* note 242, at 576–81 (surveying fairness-based justifications for transition relief and questioning whether those justifications are truly distinct from economic justifications).

²⁶⁶ See *supra* notes 252–53 and accompanying text.

invested in an upgrade before a new regulation takes effect to once again undertake costly compliance with a new standard.²⁶⁷ Thus, like considerations involving incentive effects, concerns of fairness may justify extending protection to societal actors who invest before a regulation takes effect for some reasonable period of time.

Such an approach generally accords with the concept of allowing investors a reasonable return on their investments before subjecting them to the broadly applicable new legal regime, and is not uncommon in the law of nonconforming uses.²⁶⁸ Nonconforming uses arise under zoning law when land uses prohibited by a new zoning ordinance predate the ordinance. The question arises as to how to deal with these now nonconforming uses. The continuation of the nonconforming uses might be outlawed, but the general view is that, unless an amortization period is provided, such an action might constitute a compensable taking under the Fifth Amendment, unless the uses were regulable nuisances.²⁶⁹ Some states permit the discontinuation of nonconforming uses without compensation after the owners have had a reasonable time to enjoy the fruits of the uses and, in effect, a reasonable opportunity to recoup their investments.²⁷⁰ Amortization constitutes a form of

²⁶⁷ See Shi-Ling Hsu, *Fairness Versus Efficiency in Environmental Law*, 31 *ECOLOGY L.Q.* 303, 358–59 (2004) (identifying fairness concerns as one rationale underlying grandfathering rules such as new source review under the Clean Air Act).

²⁶⁸ See generally PATRICK ROHAN, *ZONING AND LAND USE CONTROLS* § 41.04 (2003). For early treatments, see generally C. McKim Norton, *Elimination of Incompatible Uses and Structures*, 20 *LAW & CONTEMP. PROBS.* 305 (1955) and Note, *Elimination of Nonconforming Uses*, 35 *VA. L. REV.* 348 (1949). See also Allan T. Fell, *Amortization of Non-Conforming Uses*, 24 *MD. L. REV.* 323, 324–25 (1964) (“Non-conforming uses are usually continued with the expectation that they will eventually disappear” through abandonment, destruction and other normal changes. Non-conforming uses, however, still abound, with the result that one of the primary zoning problems today is the elimination of non-conforming uses.” (quoting *Schiff v. Bd. of Zoning Appeals*, 114 A.2d 644, 645 (Md. 1955))).

²⁶⁹ See, e.g., *Village of Valatie v. Smith*, 632 N.E.2d 1264 (N.Y. 1994); *City of Corpus Christi v. Allen*, 254 S.W.2d 759 (Tex. 1953).

²⁷⁰ See CAL. BUS. & PROF. CODE § 5410 (2003) (providing for a five-year amortization period for signs that do not conform to zoning restrictions); KAN. STAT. § 12-771 (2006) (“Nothing in this act is intended to prevent cities or counties from enforcing local laws, enacted under other legal authority, for the gradual elimination of nonconforming uses.”); *Livingston Rock & Gravel Co. v. Los Angeles County*, 272 P.2d 4, 8–9 (Cal. 1954) (“[Z]oning legislation looks to the future in regulating district development and the eventual liquidation of nonconforming uses within a prescribed period commensurate with the investment involved.”); *City of Los Angeles v. Gage*, 274 P.2d 34, 44 (Cal. App. 1954) (upholding a five-year amortization for non-residential uses in residential area, and explaining that “[u]se of a reasonable amortization scheme provides an equitable means of reconciliation of the conflicting interests in satisfaction of due process requirements”); *Bd. of Zoning Appeals v. Leisz*, 702 N.E.2d 1026, 1032 (Ind. 1998) (overruling prior precedent that amortization statutes were per se unconstitutional and noting that “[m]ost states allow local zoning authorities to phase out nonconforming uses with amortization provisions that require the owner to discontinue the nonconforming use after a certain period of time”); *Spurgeon v. Bd. of Comm’rs of Shawnee County*, 317 P.2d 798 (Kan. 1957) (upholding as reasonable the elimination of nonconforming uses without compensation within two years); cf. IND. CODE ANN. § 36-7-4-616 (2006) (protecting agricultural nonconforming uses in perpetuity).

transition relief; it is a form of delayed implementation of a new legal regime.

Along similar lines—although without the specter of the Fifth Amendment in the near background—one might grant pollution sources that are in compliance with a preexisting legal standard a reasonable period of time before obligating them to upgrade their pollution control system to comply with the new standard.²⁷¹ The reasonable period of time should be set by reference to the anticipated useful life of the technology, without reference to extensions in useful life that arise from the grandfathering itself, since fairness requires only that the investor receive a reasonable return on the investment.

The Clean Water Act implements this idea to some extent. As we noted above, the Act provides that if new standards for point sources are adopted within a ten-year “protection period,” the source can attain an NPDES permit, which will exempt the source from complying with the newer standards.²⁷² The ten-year period can be seen as a proxy for the amortization of actors’ investments in the then-current technology.

Once again, even if a case can be made for limited transition relief on the basis of fairness, the new regulations are not reasonable. Indeed, even the *preexisting* grandfathering of preexisting sources as structured under the Clean Air Act is not appropriate because it can continue forever. Thus, its duration is no way linked to the amortization of societal actors’ investments. As discussed above, the new regulations exacerbate this problem. They extend even greater grandfathering protection without regard to the amortization of any investments.

Given that the anticipated useful life of plants in operation in 1970 extended at most thirty or forty years into the future,²⁷³ any argument that the owners of such plants should have the ability to amortize their investments is moot: They have already enjoyed the benefits of amortization. The only question now is whether those benefits should be extended even further. Since any reasonable form of transition relief has already been granted and exhausted, the presumption against transition relief strongly contradicts the new regulations’ further extension of grandfathering.

CONCLUSION

In this Article, we have argued that the EPA’s regulations, which make it easier for polluters to modernize without meeting the requirements of the Clean Air Act, are misguided. This extension of the original grandfathering contemplated in 1970 cannot be justified by reference to the economic

²⁷¹ See Robertson, *supra* note 1, at 173–76 (discussing the possibility of using amortization and other land-use devices in the environmental context); Varadarajan, *supra* note 18, 2576–87.

²⁷² See 33 U.S.C. § 1316(d) (2000); 40 C.F.R. § 122.29(d)(1) (2006).

²⁷³ See *supra* notes 18–20 and accompanying text.

terms adduced by the Bush Administration. Quite the contrary, the new regulations may retard the introduction of new, clean plants and keep inefficient plants operating longer than they otherwise would. Moreover, grandfathering may make it more expensive for parts of the country to meet the national ambient air quality standards, which are the Clean Air Act's centerpiece, and may give rise to perverse investment incentives.

While grandfathering may be appropriate in certain circumstances, there is little justification for expanding preexisting grandfathering, as the EPA regulations do. The plants that are the major beneficiaries of the policy have already exceeded their anticipated useful lives. Their owners have more than reaped the return they could reasonably have anticipated on their investments. The original grandfathering, in fact, has already led them to operate longer than they would have if the Clean Air Act had never been enacted.

More generally, we have argued that grandfathering may be appropriate in environmental regulation to the extent that installing and upgrading pollution control equipment in existing plants may be both logistically difficult and expensive. A reasonable amortization period might be offered to plants that invest so as to comply with existing environmental standards. In contrast, it makes little sense to offer grandfathering in perpetuity, extensions of preexisting grandfathering benefits, and grandfathering benefits without receiving some concession in return. Congress and the EPA would do well to limit grandfathering rather than to expand it, and, if they do choose to extend it, to do so only in return for some specific benefit that is sufficiently compelling. Unfortunately, the history of grandfathering under the Clean Air Act has been quite different.

