UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

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August Term, 2003

(Argued November 6, 2003 Decided May 19, 2004)

Docket No. 02-4107

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ENVIRONMENTAL DEFENSE,

Petitioner,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
CHRISTINE TODD WHITMAN, Administrator,
U.S. Environmental Protection Agency,

Respondents,

STATE OF NEW YORK,

Intervenor.

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Before:
CARDAMONE, SOTOMAYOR, and KATZMANN,
Circuit Judges.

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Petitioner Environmental Defense appeals from an action taken by the U.S. Environmental Protection Agency, which on February 4, 2002, issued a final rule approving the Intervenor New York State's plan for attaining national air quality standards for ozone by the applicable attainment date. Petitioner challenges the agency's action on a number of grounds none of which is sufficient to overturn the administrative ruling.

Petition denied.

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DAVID S. BARON, Earthjustice, Washington, D.C., for Petitioner Environmental Defense.

PAMELA S. TONGLAO, U.S. Department of Justice, Washington, D.C. (Thomas L. Sansonetti, Assistant Attorney General, U.S. Department of Justice, Environment and Natural Resources Division, Environmental Defense Section, Washington, D.C.; Howard J. Hoffman, Jan Tierney, U.S. Environmental Protection Agency, Office of General Counsel, Washington, D.C., of counsel), for Respondent U.S. Environmental Protection Agency.

GORDON J. JOHNSON, Deputy Bureau Chief, New York, New York (Eliot Spitzer, Attorney General of the State of New York, Marion R. Buchbinder, Deputy Solicitor General, New York State Department of Law, Environmental Protection Bureau, New York, New York, of counsel), for Intervenor State of New York.

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CARDAMONE, Circuit Judge:

This case concerns the air we breathe. All people rightfully believe that they are entitled to nothing less than the common liberty of smogless air. On this appeal, we review the New York metropolitan area's efforts towards that goal.

To put this case in context, and drawing on legislative history, we essay a very brief summary of what the legislative and the executive branches of government have aimed to accomplish since 1963 when Congress enacted the Clean Air Act, the first modern environmental law. Testimony in 1965 before legislative committees revealed worsening air pollution problems resulting from motor vehicles and stationary sources burning sulfur-bearing fuels. See S. Rep. No. 101-228, at 1 (1990), reprinted in 1990 U.S.C.C.A.N. 3385, 3387. The consequential health problems to America are serious and pervasive because we have no choice but to breathe the air around us regardless of whether it is clean or polluted. S. Rep. No. 101-228, at 3.

In 1989 over half the U.S. population was breathing air considered unhealthful by medical researchers despite the 1977 amendments to the Clear Air Act. Id. So the 1963 Act was amended again in 1990, with the goal of enhancing the quality of our nation's air resources. The statute enumerates six criteria pollutants for which the Environmental Protection Agency must establish ambient air quality standards that limit the maximum concentration of each pollutant to the level that protects the public health. The six criteria pollutants are: ozone, lead,

sulfur dioxide, particulates, nitrogen dioxide, and carbon monoxide. We deal on this appeal with ozone.

Before us is a petition to review final action taken by the United States Environmental Protection Agency (EPA or agency). On February 4, 2002 the agency approved a revision to New York's State Implementation Plan (state plan or plan) which demonstrated the state's ability to meet required air quality standards for ozone pollution by the applicable attainment date. See Approval and Promulgation of Implementation Plans, New York, 67 Fed. Reg. 5170 (Feb. 4, 2002) (codified at 40 C.F.R. § 52.1683 (2003)). Petitioner Environmental Defense (petitioner) challenges several provisions of the state plan as being in contravention of the Clean Air Act and EPA regulations.

BACKGROUND

A. The Statutory Framework

The Clean Air Act (Act), 42 U.S.C. §§ 7401 et seq. (2000), establishes a comprehensive regulatory scheme designed to promote public health by enhancing the nation's air quality. See § 7401(b)(1). The Act charges EPA with identifying air pollutants and with establishing National Ambient Air Quality Standards (air quality standards) that specify the maximum permissible concentrations of those pollutants in the ambient air. Id. §§ 7408-09. EPA has promulgated air quality standards for various pollutants, including ozone. 40 C.F.R. § 50.9(a).

Although this federal agency is responsible for promulgating air quality standards, the primary responsibility for meeting

these standards rests with the states. 42 U.S.C. § 7407(a). The Act requires each state to discharge that responsibility by formulating a plan -- to be approved by EPA after reasonable notice and opportunity for comment -- which demonstrates a state's ability to attain and maintain the required level of air quality in each control region within the state. § 7410.

A state plan under the Clean Air Act must contain enforceable pollution control measures with defined timetables for compliance, as well as a program to implement and enforce those measures. § 7410(a)(2). The Act lists additional detailed requirements to limit emissions and assure that the state has adequate resources and authority to carry out its plan. Id. Air quality control regions that are classified as ozone nonattainment areas are subject to several additional requirements, such as enhanced monitoring and an attainment demonstration. §§ 7511, 7511a. Despite the requirements of the Act, states have considerable leeway in selecting the particular methods and programs they will use to achieve compliance with the national standards. See Union Elec. Co. v. EPA, 427 U.S. 246, 266 (1976) ("So long as the national standards are met, the State may select whatever mix of control devices it desires . . . .").

EPA identifies areas, known as air quality control regions, that exceed the standards for a particular pollutant and categorizes those regions as "nonattainment" areas. 42 U.S.C. § 7407(d). Ozone nonattainment areas are further classified as marginal, moderate, serious, severe, or extreme, depending on the

extent of the ozone problem. § 7511(a). The greater New York City metropolitan area, which includes portions of New York, Connecticut, and New Jersey,[1] is an air quality control region and has been labeled since 1990 as a severe ozone nonattainment area due to its high levels of ozone. 40 C.F.R. § 81.333. The plan at issue in this litigation is New York's plan for that portion of the air quality control region that is within the state of New York.

Several of the Act's provisions are central to this petition. First, each plan for a severe ozone nonattainment area must contain an "attainment demonstration" by which a state demonstrates that it will achieve the air quality standards by the applicable attainment date. 42 U.S.C. § 7511a(c)(2)(A), (d). This demonstration "must be based on photochemical grid modeling or any other analytical method determined by the Administrator, in the Administrator's discretion, to be at least as effective." § 7511a(c)(2)(A).

Photochemical grid modeling is a sophisticated computerized method of predicting what ozone levels will be in the future. The model creates a three-dimensional grid over the entire control region and analyzes how emissions from various sources

[1] The three states jointly conducted some modeling and analyses, but each state submitted a separate plan and EPA approved each state's plan individually. See Approval and Promulgation of Air Quality Implementation Plans, Connecticut, 66 Fed. Reg. 63,921 (Dec. 11, 2001) (codified at 40 C.F.R. § 52.377); Approval and Promulgation of Implementation Plans, New Jersey, 67 Fed. Reg. 5152 (Feb. 4, 2002) (codified at 40 C.F.R. § 52.1582). Only New York's plan has been challenged.

combine in the atmosphere to create pollutants such as ozone. Photochemical reactions can produce ozone when oxides of nitrogen (NOx) and volatile organic compounds (VOCs) are released into the air and combine with sunlight. See 40 C.F.R. pt. 58 app. D. § 2.5. Ozone production is affected by a variety of factors such as temperature, wind, and emissions levels. By manipulating other variables like meteorology, terrain, predicted population growth, and the effect of planned emissions reductions, the model attempts to predict ambient ozone concentrations on the applicable attainment date. See 1000 Friends of Maryland v. Browner, 265 F.3d 216, 220-21 n.4 (4th Cir. 2001).

In addition to the attainment demonstration, the state plan must contain "enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment." 42 U.S.C. § 7502(c)(6). This section of the Act sets forth the degree of specificity required of a state plan's provisions, and requires that the plan provide for attainment of the standards by a specific deadline, which for the New York City area is November 15, 2007. § 7511(a)(1), (2).

B. New York's Plan

Although New York submitted a plan in the past, it was required to revise that plan to comply with the Clean Air Act's 1990 amendments. The present dispute concerns New York's 1998

submission of its one-hour ozone attainment demonstration for the New York City air quality control region. Approval and Promulgation of Implementation Plans, New York, 64 Fed. Reg. 70,364, 70,375 (proposed Dec. 16, 1999). EPA's one-hour standards for ozone -- the maximum average concentration of ozone measured over a one-hour period -- is 0.12 parts per million (ppm). 40 C.F.R. § 50.9. For models using three digits, EPA uses rounding conventions to permit up to 124 parts per billion (ppb).[2]

New York's attainment demonstration used a type of EPA-approved photochemical grid modeling called the Urban Airshed Model to predict the concentration of ozone levels in 2007, following EPA's protocols in the application and validation of the model. 40 C.F.R. pt. 51 app. W. Using meteorological data from two extreme ozone events in 1988 and 1991, New York's model predicted that comparable weather events in 2007 would create measurements of 171 ppb based on the 1988 conditions and 169 ppb based on the 1991 conditions. Each of these results significantly exceeds the maximum permissible level of 124 ppb.

Recognizing that these results were too high and believing that the Urban Airshed Model contained inaccuracies that tended to produce high results, New York applied weight of the evidence analysis to adjust the high test results. Weight of the evidence

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[2] Petitioner argues that 0.12 ppm translates into 120 ppb and that EPA has no authority to relax the standard to 124 ppb. Because our resolution of the issues before us does not turn on this distinction, we do not address it.

analysis is essentially a totality of the circumstances approach, one that considers all available data to evaluate the reasonableness of the modeled results and which supplements those results. The agency views weight of the evidence analysis (or supplementary analysis) as helpful to addressing uncertainties that exist in the photochemical grid modeling. In a 1996 manual used to guide attainment of national air quality ozone standards, it reasoned, "First, photochemical grid models require a great deal of information. Much of this information is uncertain. Further, model formulation reflects limits imposed by existing scientific knowledge as well as by computational necessities. Uncertainties in model inputs and limitations in model formulation lead to uncertainties in model predictions." This uncertainty requires a revised attainment test. "A second finding from recent model applications is that controls estimated as necessary to attain the [national air quality standards] can be very high. Despite such estimates, monitored ozone data reflect downward trends in many areas over the past 10 years (U.S. EPA, 1994). Monitored data are the definitive means for classifying an area's attainment status." Office of Air Quality Planning and Standards, U.S. EPA, Guidance on Use of Modeled Results to Demonstrate Attainment of the Ozone NAAQS, EPA-454/B-95-007, at § 1.2 (June 1996) [hereinafter Guidance on Modeled Results].

It is now thought that the modeled attainment test may be too conservative. Because of the inherent imprecision of the

model other means must be looked at to determine if a plan's controls will lead to attainment.

> The process by which this is done is called a weight of evidence (WOE) determination. Under a WOE determination, a state can rely on, and EPA will consider in addition to the results of the modeled attainment test, other factors such as other modeled output (e.g., changes in the predicted frequency and pervasiveness of 1-hour ozone NAAQS exceedances, and predicted change in the ozone design value); actual observed air quality trends (i.e. analyses of monitored air quality data); estimated emissions trends; and the responsiveness of the model predictions to further controls.

Approval and Promulgation of Implementation Plans, New York, 67 Fed. Reg. at 5175.

After New York conducted its weight of the evidence analysis, it concluded that the adjusted results were in the range of 118 to 122 ppb, and New York therefore believed it had satisfied the attainment requirements. EPA independently considered the results of New York's tests. Its Urban Airshed Model test results, like New York's, yielded results well beyond permissible levels, but, applying its own weight of evidence analysis lowered its 2007 predictions to 129 ppb, slightly above the required air quality standards.

EPA and New York offer two reasons for New York's high results from the model. First, they assert the output of the model does not match the applicable air quality standard. The actual standard, which determines attainment, allows a certain number of episodes exceeding the 124 ppb requirement. These are

called exceedances. The control area measured over a three-year period is permitted up to three exceedances during this period. Thus, the fourth highest reading during that period, known as the design value, is the crucial result to determine whether attainment has been achieved. Because the computer model only predicts peak readings, it does not ascertain what is the area's all-important design value.

Second, the agency and New York maintain the model's results were inconsistent with other evidence. In particular, they observed that the model predicted nearly equivalent results in 2007 as the results measured in the period 1995-98. Because several emission control strategies implemented after 1999 were not included in the model, EPA and New York believed the model over-predicted the 2007 results. Noting there is limited data on how accurate the model is in predicting future ozone levels, EPA and New York both determined that further weight of the evidence analysis was warranted.

Even after the supplementary analysis, New York's predicted ozone level was still slightly above the air quality standards. In response to this shortfall, New York offered commitments to adopt and submit additional control measures by October 31, 2001. As part of the commitment, New York submitted reports detailing some of the steps it would take, including reducing emissions of ozone precursors and adopting six emission reduction measures recommended by the Ozone Transport Commission. The state concedes that it missed its deadline, but it continued to update

EPA on its progress, and both New York and EPA insist the delay would not prevent New York from attaining the ozone standards by 2007.

EPA approved New York's plan after public notice and an opportunity for comment. Approval and Promulgation of Implementation Plans, New York, 67 Fed. Reg. 5170. The agency formally approved of the use of weight of the evidence analysis to supplement the results of the photochemical grid model. It also accepted New York's enforceable commitments to close the gap and excused the late submission of those commitments, determining that New York was sufficiently on track so that it would attain required air quality standards by the attainment date. Id. at 5188.

C. Petitioner's Challenges

Petitioner challenges EPA's final approval of the New York plan on the grounds that it does not comply with the Act or EPA regulations and that therefore the agency's approval was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.

Petitioner's primary challenge is to the application of the weight of evidence analysis to the results of the photochemical grid modeling to demonstrate attainment. Petitioner believes the weight of evidence analysis does not merely supplement the model but rather displaces it. It also maintains that weight of evidence analysis runs afoul of EPA's own regulations because it was derived without following the necessary notice and comment

procedures. Petitioner argues, in addition, that the agency's analysis calculated emissions reductions that assumed a linear relationship between those reductions and a decrease in ozone levels, and that such calculations violated the agency's rule prohibiting "proportional (rollback/forward) modeling." 40 C.F.R. pt. 51 app. W § 6.2.1.e (2002).[3] Petitioner insists the modeling in any event does not demonstrate attainment by November 15, 2007.

Petitioner next takes issue with EPA's finding that New York would achieve levels of 129 ppb by 2007 since its plan only contains commitments to close the gap instead of actual adopted control measures. Finally, the third attack on the EPA ruling is that it circumvents the Act's schedule for submitting state plans and impermissibly and indefinitely extends the statutory deadline.

Petitioner declares that because of the deficiencies it identified, EPA should have rejected New York's plan. It notes in the alternative that EPA, instead of issuing a final approval, could have attempted to follow the Act's conditional approval mechanism, 42 U.S.C. § 7410(k)(4), though it doubts that New York's plan would have qualified even for conditional approval. With those challenges in mind we turn to a discussion of them,

[3] We apply the language of Appendix W as it read during the relevant time frame. Appendix W has since been amended. See 40 C.F.R. pt. 51 app. W (2003).

but before doing that, there are two threshold matters that must be resolved.

DISCUSSION

I Standard of Review

The first of these is the standard of review we apply to this appeal. We have jurisdiction under § 307(b)(1) of the Clean Air Act to review EPA's final action approving the New York plan. 42 U.S.C. § 7607(b)(1). Because the Act contains no independent standard of review, we review the agency's actions pursuant to the Administrative Procedure Act, setting aside agency action only when it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A) (2000); New York Pub. Int. Res. Group v. Whitman, 321 F.3d 316, 324 (2d Cir. 2003) (applying the "arbitrary and capricious" standard to evaluate EPA action taken pursuant to Clean Air Act).

The arbitrary and capricious standard of review is narrow and particularly deferential. Erie-Niagara Rail Steering Comm. v. Surface Transp. Bd., 247 F.3d 437, 441 (2d Cir. 2001). We reverse the agency only when there has been a "clear error of judgment." See Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971). Our task under this standard is to decide if the agency has considered the evidence, examined the relevant factors, and spelled out a satisfactory rationale for its action including the demonstration of a reasoned connection between the facts it found and the choice it made. See J. Andrew Lange, Inc. v. FAA, 208 F.3d 389, 391 (2d Cir. 2000).

When a federal agency takes action under a particular statutory provision, we review the agency's interpretation of the statute under Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837 (1984). Chevron analysis asks first "whether Congress has directly spoken to the precise question at issue." Id. at 842. If so, analysis ends. The reason for this is because both the agency and the courts "must give effect to the unambiguously expressed intent of Congress." Id. at 842-43. If the statute has not addressed the question or is ambiguous, the agency's interpretation of the statute may be entitled to deference. See id. at 843. But first it must be determined whether Congress explicitly or implicitly delegated authority to the agency to interpret ambiguities in the statute. See United States v. Mead Corp., 533 U.S. 218, 226-31 (2001). Generally, when the agency is charged with implementing a statute, and its interpretation was reached through formal notice and comment rulemaking, its construction of the statute will, if reasonable, be granted deference by the reviewing court. Id. at 229-30.

In the case at hand, Congress has delegated to the EPA the authority to review state plans for their compliance with the Clean Air Act. See 42 U.S.C. § 7410(k). EPA's authority to interpret ambiguities in the Act manifestly follows from its role in implementing the statute. Since EPA's interpretation of the relevant Act provisions was promulgated through notice and comment rulemaking -- and reflects reasoned deliberation -- its

interpretation of an ambiguous provision should, if reasonable, be upheld.

II Collateral Estoppel

Next we address EPA's contention that petitioner is collaterally estopped from pursuing several of its arguments before us because it was on the losing side of a recent Fifth Circuit decision, BCCA Appeal Group v. EPA, 355 F.3d 817 (5th Cir. 2003). BCCA involved EPA's approval of Texas' plan for the Houston-Galveston severe ozone nonattainment area. In its attainment demonstration, Texas applied weight of the evidence analysis, and also offered enforceable commitments to close the gap between its predicted results and the applicable air quality standards. The Fifth Circuit upheld EPA's final rule approving the Texas plan. Id. at 848. While acknowledging that another circuit's decision is not binding on us, EPA argues it should nevertheless foreclose petitioner from relitigating in this forum because it was one of the petitioners in BCCA.

The judicially-created doctrine of collateral estoppel, or issue preclusion, bars a party from relitigating in a subsequent proceeding an issue of fact or law that was clearly raised in a prior action where the party to be precluded, here petitioner, had a full and fair opportunity to litigate the issue, Purdy v. Zeldes, 337 F.3d 253, 258 (2d Cir. 2003), and a decision on that issue was necessary to support a valid and final judgment on the merits. See Interoceanica Corp. v. Sound Pilots, Inc., 107 F.3d 86, 91 (2d Cir. 1997). The doctrine serves to "relieve parties

of the cost and vexation of multiple lawsuits, conserve judicial resources, and, by preventing inconsistent decisions, encourage reliance on adjudication." Allen v. McCurry, 449 U.S. 90, 94 (1980).

EPA points out that four legal issues decided in BCCA are much the same as the issues presently raised. Collateral estoppel does not apply however when the essential facts of the earlier case differ from the instant one, even if they involve the same legal issues. When the facts essential to a judgment are distinct in the two cases, the issues in the second case cannot properly be said to be identical to those in the first, and collateral estoppel is inapplicable. Montana v. United States, 440 U.S. 147, 159 (1979).

We agree with petitioner that there are several significant factual distinctions between this case and BCCA. One major difference is the physical properties of the two regions. For example, BCCA noted the Houston-Galveston area was affected by a "unique land-sea breeze meteorological condition." 355 F.3d at 823 n.1. In addition, other model inputs such as terrain, population, and state emissions laws differ significantly from Texas to New York. Such differences affect how a court assesses the reliability and accuracy of the model test results and therefore the appropriateness of supplemental analysis.

Further, the type of weight of evidence analysis used in Texas was quite different from the analysis employed in New York. Texas used a quadratic equation to calculate the additional

reductions needed to satisfy the national air quality standards. BCCA, 355 F.3d at 834. New York applies a Relative Reduction Factor to predict design levels rather than peak levels. These different approaches are sufficiently distinct so as to critically affect the assessment of the weight of evidence analysis. We must determine if the approach utilized in New York's plan comports with the Act, and because that approach is not comparable to the one used in Texas, we cannot with any degree of certainty say that issue has already been resolved.

To the extent that EPA characterizes a number of the issues as questions of law -- and therefore not dependent on the factual context -- its arguments implicate another limitation on applying collateral estoppel. "[W]here pure questions of law -- unmixed with any particular set of facts -- are presented to a court, the interests of finality and judicial economy may be outweighed by other substantive policies." United States v. Alcan Aluminum Corp., 990 F.2d 711, 719 (2d Cir. 1993); accord 18 Charles Alan Wright, et al., Federal Practice & Procedure § 4425 (2d ed. 2002). Here the public nature of the issues presented counsels against strict application of collateral estoppel. The petition challenges the actions of a government agency, whose decision concerns a matter of great public importance, that is the quality of the air millions of citizens breathe daily. The traditional concerns about relieving the parties of the costs of litigation and conserving judicial resources must be weighed against the

interests of nonparties where this legal challenge implicates the public good.

It is worth noting in passing that EPA likely would not be bound by collateral estoppel were it to have lost the BCCA appeal, precisely because government cases often involve legal questions of substantial public importance, and because applying collateral estoppel in public cases involving geographic breadth "would substantially thwart the development of important questions of law by freezing the first final decision rendered on a particular legal issue." United States v. Mendoza, 464 U.S. 154, 160 (1984). While we recognize that Mendoza only precludes nonmutual offensive collateral estoppel against the government, its rationale is informative in a case like this, which affects the public interest and is only one of a series of legal challenges across the country. In short, petitioner is not collaterally estopped from pursuing its arguments before us.

III Attainment Demonstration

A. Weight of Evidence Analysis

Having disposed of the threshold matters, we turn to the merits. Petitioner's primary argument is that the weight of evidence analysis applied by New York and EPA contravenes the Act and the EPA's regulations. It believes this supplementary analysis fundamentally alters the results of the model to a degree that the attainment demonstration no longer can fairly be said to be based on photochemical grid modeling.

1. Statute

We discuss this challenge first with respect to the Act, and then with regard to the regulations. We begin with the language of the statute. The Clean Air Act requires that the attainment demonstration be "based on photochemical grid modeling." 42 U.S.C. § 7511a(c)(2)(A). The phrase "based on" means to be "used as a base or basis for." Webster's Third New International Dictionary 180 (1986) (definition 2). The relevant definition of "basis" in turn is "principal component" or "fundamental ingredient." Id. at 182 (definition 2). In its plain meaning, "based on" means "having as the foundation" or "arising from." McDaniel v. Chevron Corp., 203 F.3d 1099, 1111 (9th Cir. 2000) ("based on" means "arising from" and ordinarily refers to a "starting point" or "foundation"); Mount Vernon Fire Ins. Co. v. Creative Hous. Ltd., 668 N.E.2d 404, 406 (N.Y. 1996) ("based on" essentially equivalent to "arising out of"); United States ex rel. Siller v. Becton Dickinson & Co., 21 F.3d 1339, 1348 (4th Cir. 1994) (the ordinary meaning of "based upon" is "derived from"). The appropriate question then is whether New York's attainment demonstration, after the weight of evidence analysis, has the photochemical grid model as its foundation.

The statute does not articulate the role of the photochemical grid model with precision. Other courts of appeals that have examined the Act's language and the phrase "based on photochemical grid modeling" have found the phrase ambiguous, and we agree. See BCCA, 355 F.3d at 835; Sierra Club v. EPA, 356

F.3d 296, 305-06 (D.C. Cir. 2004). The attainment demonstration need not rely solely on the grid model, and by the same token the demonstration may not abandon the model altogether. Between these two extremes is an attainment demonstration based on photochemical grid modeling; though precisely where between them is not clear. EPA has said that where the modeled results form the principal component of the analysis, an attainment demonstration obtained by adjusting those results with supplemental information is still based on the grid model.

The grid model is not flawless, as petitioner recognizes, and EPA concedes the model contains potential inaccuracies. It could not be otherwise when one considers the photochemical grid model is a highly complex method of predicting how chemicals will combine in the atmosphere to create ozone years in the future. A reviewing court must remember that the agency is making predictions at the frontiers of science. In "examining this kind of scientific determination, as opposed to simple findings of fact, a reviewing court must generally be at its most deferential." Baltimore Gas & Elec. Co. v. Natural Res. Def. Council, Inc., 462 U.S. 87, 103 (1983).

Although the photochemical grid analysis is the best available method of predicting ozone concentrations, EPA, based on its experience and the experience of states within its regulatory purview, has identified many inaccuracies in this form of measurement. See Guidance on Modeled Results, supra, at Table S.1; Approval and Promulgation of Implementation Plans, New York,

67 Fed. Reg. at 5175. For that reason the agency has taken appropriate steps to address those inaccuracies in the model, which steps are permissible so long as they are taken in a manner consistent with the agency's statutory mandate.

The record supports the EPA's conclusion that further analysis was appropriate for the New York plan. EPA found the model predicted comparable ozone levels in 2007 to levels measured in the period 1995-98 and believed this result improbable since numerous emissions reduction measures were due to be implemented between 1999 and 2007. It also found the model predicted that 87 percent of the points measured in the grid that exceeded the ozone levels in 1990 were predicted to attain the attainment standard by 2007. Given that high degree of improvement, EPA considered it anomalous that the model also predicted ozone peaks as high as 171 ppb in 2007.

EPA declares that even with the supplemental analysis, photochemical grid modeling results constitute the principal component of its analysis, with the additional analysis simply aiding its accounting for uncertainties in the model. 67 Fed. Reg. at 5175. The grid model results formed not only the starting point of New York's weight of evidence analysis, but they also served as a prominent part of the substantive aspects of that analysis. That analysis attempted to project future design levels based on the modeled results, a method known as design value rollback. This method explicitly used the results of the grid modeling to estimate air quality benefits from Clean

Air programs implemented through 2007. The photochemical grid model results were also used to estimate the air quality benefits from EPA's proposed ozone transport program. By subtracting the model's predicted improvements from the current design values, New York predicted that its design values in 2007 would be 118-122 ppb.

EPA supplemented New York's analysis by evaluating different years, and having as its starting point an average of the design values for the years 1990, 1991, and 1992. The agency then calculated the percentage of peak ozone reductions from the base year to the model's predictions for the attainment year, a percentage it calls the Relative Reduction Factor. By applying the factor to the design levels of the base period, EPA estimated the design values for the attainment year. It concluded from these computations first that the varying results from different applications of the design value rollback supported its belief that there was uncertainty in the grid model's projections. It also concluded that New York's real design value in 2007 was likely to be about 129 ppb -- close to, but not quite attaining the one-hour national air quality standards.

Such analysis is consistent with the language of the statute because under EPA's approach, grid modeling forms the foundation and principal component of the attainment demonstration. Each aspect of the weight of evidence analysis used data from the photochemical grid model, and the corrections were applied to the results of the model. The record suggests that this analysis was

applied to correct for errors in the model, with an eye towards the ultimate goal of assessing whether the state plan provided for attainment by the deadline. It is not our charge to second guess the agency's scientific conclusions. If it has articulated a rational reason why weight of the evidence analysis was appropriate, and that reason finds support in the record, we must affirm it. See Motor Vehicle Mfrs. Ass'n of the United States v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 42-43 (1983).

Accordingly, we are persuaded that the EPA's analysis was based on a reasonable interpretation of the Act and was applied after satisfactory evaluation of the relevant data. EPA has articulated a rational explanation for its actions based on the facts found. That is all that is required.

2. EPA Regulations

Petitioner also believes that EPA's supplemental analysis contravenes its own regulations. Those rules provide that "[t]he adequacy of a control strategy shall be demonstrated by means of applicable air quality models, data bases, and other requirements specified in appendix W of this part (Guideline on Air Quality Models)." 40 C.F.R. § 51.112(a)(1). Appendix W in turn offers broad guidance on the use of grid modeling, including recommended types of models, design considerations, and a discussion of uncertainty of the models. 40 C.F.R. pt. 51 app. W § 6.1 (2002). The appendix recommends the Urban Airshed Model for photochemical grid modeling, and refers users to EPA's Guideline for Regulatory

Application of the Urban Airshed Model (Guideline). See id. § 6.2.1(a).

EPA first issued the Guideline in 1991 and then revised it in 1996 and subsequently. The 1991 Guideline provided that "there should be no predicted daily maximum ozone concentrations greater than 0.12 ppm anywhere in the modeling domain," and if attainment is not demonstrated, the model must be repeated as an iterative process "until attainment is shown for each modeled episode." Office of Air Quality Planning and Standards, U.S. EPA, Guideline for Regulatory Application of the Urban Airshed Model, 14, 63 (July, 1991) [hereinafter Guideline for Regulatory Application]. However, the 1996 revision superseded this strict language and allowed more flexibility in the testing to track more closely the limited exceedances permitted by the air quality standards. See Guidance on Modeled Results, supra, at § 2. The 1996 guidance also recognized uncertainties in the grid models that practitioners were beginning to identify through experience.

Petitioner contends that the 1991 Guideline is a rule because it was incorporated into Appendix W and that, as a rule, the 1991 Guideline can only be changed through notice and comment rulemaking. 5 U.S.C. § 553. It believes that the later revisions were invalid because they were not adopted through formal procedures. Thus, petitioner maintains EPA's actions with respect to the New York plan were inconsistent with its own 1991 Guideline, which it claims is still in effect.

We agree with EPA that the Guideline is not a rule and that the subsequent revisions were effective notwithstanding the lack of formal rulemaking procedures. While Appendix W may only be amended by notice and comment rulemaking, it only "refer[s]" users to the Guideline "for additional data requirements and procedures for operating this model." 40 C.F.R. pt. 51 app. W § 6.2.1(a). The language referring users is not mandatory, nor does it express an intent to incorporate the Guideline. Cf. PPG Indus., Inc. v. Costle, 659 F.2d 1239, 1250 (D.C. Cir. 1981) (where rule requires use of procedures described in guideline, then guideline intended to be mandatory and must be adopted through formal notice and comment procedure). The Guideline on its own terms is not legislative, but rather "provides recommendations and procedures" for conducting an analysis with the Urban Airshed Model. Guideline for Regulatory Application, supra, at 1. Hence, the Guideline is simply a useful manual and may be revised without formal procedures, although lack of such procedures also means that the Guideline has not the independent force of law. See Used Equip. Sales, Inc. v. Dep't of Transp., 54 F.3d 862, 867 (D.C. Cir. 1995) (guidelines not promulgated pursuant to notice and comment rulemaking "have no legal effect apart from the agency's ability to persuade this court to the view they reflect").

Petitioner further challenges the supplemental methodology on the ground that part of EPA's analysis violated Appendix W's mandate that "[p]roportional (rollback/forward) modeling is not

an acceptable procedure for evaluating ozone control strategies." 40 C.F.R. pt. 51 app. W § 6.2.1.e. "Rollback" is defined as "[a] simple model that assumes that if emissions from each source . . . are decreased by the same percentage, ambient air quality concentrations decrease proportionately." Id. § 14.0. When EPA calculated the additional emissions reductions New York needed to effectuate in order to attain the ozone standard, it used a method of estimating reductions in emissions of ozone precursors that assumed a linear relationship between those reductions and the corresponding reduction in ozone concentration. See Approval and Promulgation of Implementation Plans, New York, 67 Fed. Reg. at 5176-77.

EPA asserts that linear rollback has always had some degree of validity and widespread acceptance, and that the prohibiting clause of Appendix W was intended only to prohibit linear rollback as the sole basis for demonstrating attainment. When rollback is based on modeled test results, and addresses only a limited reduction in ozone concentrations, the agency maintains the method does not suffer from the same simplistic failures as when it is applied to the whole program. EPA believes linear approximations can be helpful in circumstances where (1) only a small increment of the overall ozone reduction is being addressed and (2) the relationship between precursors and ozone is derived from locally modeled or measured air quality. Id.

When interpreting its own regulations, set forth in a final rule, the agency's interpretation is "controlling unless plainly

erroneous or inconsistent with the regulation." Auer v. Robbins, 519 U.S. 452, 461 (1997). We believe that EPA's interpretation satisfies that highly deferential standard. The definition of proportional rollback as a simplistic model using a blanket assumption leaves room for EPA to conclude that a comparable type of analysis is not prohibited when it is based on measured data and applied only to a narrow range of effects. Whether and to what extent linear relationships exist between assorted variables and ozone reduction is a matter for the expert judgment of EPA, and its determination that the analysis used here does not contravene Appendix W is not unreasonable.

Consequently, since the 1996 revision and subsequent revisions to the Guideline were effective, and because those revisions contemplate the use of supplemental analysis, including weight of evidence, EPA's approval of the New York plan did not contravene its own rules or guidelines.

B. Attainment Deadline

In a related attack on the attainment demonstration, petitioner argues that the model failed to demonstrate attainment by the deadline of November 15, 2007. The EPA measures compliance with the standard over a three-year period, and the standard is violated if the average number of exceedances over a three-year period is greater than one. 40 C.F.R. § 50.9(a) & app. H (2003). For example, three exceedances over a three-year period is compliant because the average number of exceedances does not exceed one. A fourth exceedance over that period would

violate the standard. Because of this method for measuring compliance, petitioner argues that New York's plan was required to demonstrate attainment in 2005 and 2006, not just in 2007, since satisfactory levels in 2007 are not sufficient to demonstrate that the standard will be met.

We agree with EPA that it is inconsistent with the statutory scheme to require attainment effectively by 2005. First, such a construction runs counter to the plain language of the Act, which sets the attainment date as November 15, 2007. 42 U.S.C. § 7511(a)(1), (2). Indeed, given that clarity of statutory language, if there were in fact a conflict between the statute and EPA's regulations, it would be the regulation that would have to yield and not, as petitioner would have it, the statute. See Chevron, 467 U.S. at 842-43. Second, other provisions of the Act envision incremental progress up until the attainment date, suggesting that Congress expected attainment by the attainment date and not sooner. See, e.g., § 7511a(c)(2)(B) (requiring at least three percent baseline emissions reductions each year up until the attainment date).

EPA asserts that the tension between the specified attainment date in 2007 and the three-year attainment test is resolved by § 181(a)(5) of the Act. § 7511(a)(5). In this section Congress delegated EPA the authority to grant a state up to two one-year extensions of the attainment deadline, if the state met certain criteria in the attainment year. This section provides

> Upon application by any State, the Administrator may extend for 1 additional year (hereinafter referred to as the "Extension Year") the date specified in table 1 of paragraph (1) of this subsection if--
>
> (A) the State has complied with all requirements and commitments pertaining to the area in the applicable implementation plan, and
>
> (B) no more than 1 exceedance of the national ambient air quality standard level for ozone has occurred in the area in the year preceding the Extension Year.
>
> No more than 2 one-year extensions may be issued under this paragraph for a single nonattainment area.

§ 7511(a)(5).

We think this extension provision permits the agency simultaneously to compel attainment by November 15, 2007, and to measure attainment over three years. EPA does not, contrary to petitioner's argument, effectively approve an extension before a state has demonstrated that it warrants one. Rather, the extension provision ensures that although a state might achieve compliance by 2005, EPA may still deem it in compliance if it attains the standard by 2007. We therefore reject the claim that EPA has relaxed the deadline for attainment. Accord Sierra Club, 356 F.3d at 307 n.9 (upholding EPA's practice of requiring plan to demonstrate attainment by the statutory deadline, reasoning that petitioner's suggested interpretation would effectively move up the statutory deadline by two years).

IV Enforceable Commitments

A. Under the Act

As discussed above, EPA concluded that New York's plan would achieve ozone levels of approximately 129 ppb by the attainment date, a level that still exceeded the national air quality standards. The agency estimated that to meet the national standard the state needed to have additional reductions of 85 tons per day of volatile organic compounds and seven tons per day of nitrogen oxides.

New York amended its plan to include as one part of its overall strategy an enforceable commitment to adopt further controls to reduce VOC and NOx emissions to make up this shortfall. The state submitted numerous revisions on a continuing basis as to how it would satisfy its obligations. Those submissions included analysis of whether there were any additional available control measures that the state could take, and it advised EPA it would be adopting six specific regulations based on the Ozone Transfer Commission's recommendations. EPA considered these submissions in conjunction with New York's overall emissions control strategy, and having determined that the plan provided for attainment by the statutory deadline it approved the state's plan.

Petitioner insists that neither the Act nor the regulations permit EPA to approve a plan containing unspecified commitments. It asserts the language of the Act compels greater specificity than simply a commitment to implement measures in the future.

The key statutory language it points to states that plans must contain "enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to meet the applicable requirements of this chapter." § 7410(a)(2)(A). Continuing its argument, petitioner contends that enforceable commitments do not qualify as "control measures, means, or techniques," pointing to language requiring ozone nonattainment areas to implement "all reasonably available control measures as expeditiously as practicable." § 7502(c)(1).

We note first the breadth of the essential language, which not only permits a wide array of types of submissions -- emission limitations, control measures, means, techniques, fees, permits, auctions, schedules, timetables -- but also requires them only as may be necessary or appropriate. In any event, the recited essential terms -- control measures, means, and techniques -- are not defined in the Act. Cf. § 7602 (definitions clause of the Act). Since Congress has not spoken directly to the question of whether New York's commitment and submissions are encompassed within the Act's relevant language, we will defer to EPA's interpretation of the language, so long as it is reasonable.

EPA has determined that New York's enforceable commitment to adopt certain additional NOx and VOC controls constituted a means or technique. This conclusion is not inconsistent with the

dictionary definitions of those terms. "Means" is defined as "something by the use or help of which a desired end is attained or made more likely: an agent, tool, device, measure, plan, or policy for accomplishing or furthering a purpose." Webster's Third New International Dictionary 1398 (definition 6). "Technique" is defined as "a technical method of accomplishing a desired aim" and as a "method, way, [or] manner." Id. at 2348 (definition 2). New York's commitments, particularly with the ongoing reports and updates submitted to EPA, could comfortably fit within these definitions. Given the breadth of the statutory language, EPA's decision to treat an enforceable commitment as a means or technique is reasonable and therefore should be upheld.

To determine whether a state's commitment is appropriate, EPA applies a three-factor test asking if: (1) it addresses a limited portion of the reductions needed for attainment; (2) the state could fulfill it; and (3) it was for a reasonable time. Approval and Promulgation of Implementation Plans, New York, 67 Fed. Reg. at 5186-87. With respect to the three factors, EPA observed: first, that New York's commitment addressed only a small portion of the reductions needed, specifically 9.1 percent of the total VOC emission reduction and 0.8 percent of the NOx emission reduction, which EPA considered a minimal portion of the required reductions, id. at 5187; and second, based on its overall evaluation of New York's resources and submissions, that the state possessed the ability to achieve its commitments. Part of the agency's favorable response on this factor was predicated

on its understanding that New York intended to adopt the control measures recommended by the Ozone Transport Commission. Id. Third, EPA acknowledged that it would take time for New York's administrative rulemaking process to adopt the required measures. It conceded the state missed the October 31, 2001 submission deadline, but recognized that this delay was due in part to the fact that the Ozone Transport Commission's regulation development process had taken longer than expected. Id. at 5188. EPA nevertheless decided that New York was sufficiently on schedule to ensure that it would attain the standard by the attainment date. This decision represents not an abdication of EPA's responsibility to ensure that the state meets the attainment deadline, as petitioner contends, but a recognition that the regulatory process was reasonably taking more time than had initially been anticipated.

The language of the Clean Air Act supports EPA's ruling that the limited acceptance of enforceable commitments, as part of a comprehensive overall strategy, was permissible. EPA's three-factor test ensures that a state's use of commitments is limited in time and scope and capable of being achieved as part of its overall plan. These commitments are enforceable by EPA and by citizen suits, and courts have enforced such commitments after EPA approved them. See BCCA, 355 F.3d at 838-39 & n.25 (citing cases).

Petitioner's reliance on National Resources Defense Council v. Environmental Protection Agency (NRDC), 22 F.3d 1125 (D.C.

Cir. 1994), is misplaced. In NRDC, the D.C. Circuit held that EPA's acceptance of a plan that contained only commitments was inconsistent with the statutory scheme. The court noted that the Act contemplated a submission timetable that included submission, followed by a completeness determination, followed by approval or disapproval. NRDC held that the completeness determination could not be made unless the submission contained "something more than a mere promise to take appropriate but unidentified measures in the future." Id. at 1134. EPA's conditional approval of only commitments, without any completeness determination or substantive review, inappropriately circumvented the Act's timetable.

NRDC turned on statutory interpretation of a different clause of the Act so that its legal analysis is not directly relevant to the case at hand. Further, NRDC is factually distinguishable since it did not address the current situation in which the submitted plan includes a comprehensive and detailed plan for attainment. Here EPA did undertake the substantive analysis that was lacking in NRDC and decided it could accept enforceable commitments in view of the fact that they represented only a small portion of an otherwise thorough plan. New York's plan does not lack any substantive elements required of a plan, and most importantly, its enforceable commitments consisted of proposed regulations that were specific enough to allow EPA to evaluate their likely efficacy and contribution to the plan as a whole. Where a state submits specific proposed regulations that

it commits to adopt within a limited time, and EPA after reasoned consideration deems the proposals sufficient to make the necessary emission reductions, we will not second-guess EPA's decision simply because the commitments have not yet been enacted. Cf. Sierra Club, 356 F.3d at 302-04 (NRDC's prohibition on empty plans extends to those that contain some substantive provisions but lack others; EPA cannot properly evaluate the sufficiency of a plan where substantive provisions are missing). We believe New York's submissions contained adequate detail for EPA to conduct its completeness analysis, and hence that its approval did not circumvent the submission timetable as the plan did in NRDC.

B. Under Agency Regulations

Contrary to petitioner's contention, EPA's rules and regulations do not prohibit its limited acceptance of commitments. EPA rules provide that the attainment plan must set forth a "control strategy" for attaining the standard, 40 C.F.R. § 51.111, and that the plan measures "must be adopted as rules and regulations enforceable by the State agency." § 51.281. Control strategy is defined broadly as any

> combination of measures designated to achieve the aggregate reduction of emissions necessary for attainment and maintenance of national standards including, but not limited to, measures such as:
>
> (1) Emission limitations.
>
> (2) Federal or State emission charges or taxes or other economic incentives or disincentives.

> (3) Closing or relocation of . . . industrial facilities.
>
> . . . .
>
> (8) Any variation of, or alternative to any measure delineated herein.

§ 51.100(n)(1)-(8). This definition of control strategy is extremely broad and, by its own terms, not comprehensive. We think EPA's conclusion that New York's plan satisfies its requirements as a control strategy is based on a permissible reading of its regulations.

As for the requirement that the provisions be adopted as rules or regulations, we agree with the agency that the commitment is enforceable as a "rule," as defined by the Administrative Procedure Act, 5 U.S.C. § 551(4). The commitment is a rule because it was adopted through notice and comment rulemaking, creates specific rights, imposes specific obligations on the state, and is enforceable against it. Accord BCCA, 355 F.3d at 840 n.29. As such, it constitutes a "statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency." § 551(4).

EPA's ultimate responsibility is to ensure that a submitted plan contains adequate provisions to achieve attainment by the applicable attainment date. We are satisfied that New York's plan contained sufficiently detailed provisions and that EPA fulfilled its obligation to assess it.

V Submission Timetable

Finally, petitioner declares that EPA has impermissibly and indefinitely extended the submission deadline for a plan by accepting an enforceable commitment that gives New York time to implement further regulations.

The commitment however was adopted as a final rule and is enforceable as of its adoption. We agree with EPA that the fact that part of the process would be concluded in the future does not amount to an extension of the deadline. The broader issue is whether New York had submitted sufficient information by the deadline for EPA to perform its role in assessing the completeness and reasonableness of the state's plan. The enforceable commitments, intended to close a small gap between measured results and the national air quality standards, included progress statements by the state that assured EPA of the specific measures it would take, such as acceptance of the Ozone Transport Commission's recommendations. New York had in fact already begun the process of adopting its additional provisions before its plan was finally approved. These submissions were sufficient for EPA to perform its evaluation, and therefore were not an impermissible circumvention of the deadline.

Petitioner thinks that if EPA wanted to approve a plan that contained commitments, it could do so only pursuant to the Act's conditional approval mechanism. 42 U.S.C. § 7410(k)(4). The Act permits conditional approval based on a commitment to adopt a specific provision within one year; if the state fails to comply

with its commitment, the conditional approval is treated as a disapproval. Id. Although we recognize that the conditional approval approach might have been an option for EPA, we cannot agree it was EPA's only option. The existence of the conditional approval procedure does not foreclose final approval of a plan that, while containing commitments, is nevertheless sufficiently comprehensive. Nothing in the language of the Act suggests that when conditional approval is available that Congress planned for that procedure to be the only means of approval.

CONCLUSION

For the reasons stated, we hold EPA's approval of New York's plan did not violate the Clean Air Act or EPA regulations. We have considered petitioner's remaining arguments and find them all to be without merit. Consequently, we deny the petition for review.

Petition denied.