Super Deference, the Science Obsession, and Judicial Review of Agency Science

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SUPER DEFERENCE, THE SCIENCE OBSESSION, AND JUDICIAL REVIEW OF AGENCY SCIENCE

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Abstract

When courts review agencies’ scientific and technical determinations, they often emphasize that the specialized subject matter requires them to be at their most deferential. This “super-deference” principle seems appealing because it is supported by basic notions of institutional competence and accommodates a natural judicial tendency to avoid deep encounters with science. But it stands in stark tension with the expectation that courts must reinforce administrative-law values like participation, transparency, and deliberation. And it fails to further the legitimizing function of incorporating the best possible science into institutional decisionmaking. Surprisingly, there is no scholarship comprehensively assessing super deference. This Article begins to fill that gap by evaluating super deference contextually, taking into consideration the norms of both science and administrative law. This analysis reveals that not only does super deference lack merit, it also lacks meaning and any framework for principled application. Building on these observations, this Article develops a normative account of the courts’ role with respect to agency science. When courts engage in such review, they can use their generalist perspectives to their advantage by serving an important translating function for generalist consumers such as Congress and the public at large—an approach that reinforces both scientific and administrative-law values.

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I. INTRODUCTION

In the quest for better alignment of science and administrative law, the role of the judiciary eludes easy assessment. The premise that expert agencies are better situated than generalist judges to make policy decisions in light of scientific uncertainty is an obvious enough starting place. Indeed, this view is encapsulated in the principle that courts ought to be at their “most deferential” when reviewing an agency’s scientific determinations.¹

This approach of “super deference” is appealing: it is supported by basic notions of institutional competence and moreover plays into a natural judicial tendency to avoid any deep confrontations with science. If we are to believe observers of judicial science—not to mention the courts themselves—super deference has the salutary impact of shifting power over science from inept generalists to superior experts.² This view is buttressed by broader administrative law values: if agency science is mostly about policy, and the politically-accountable executive controls agencies, then agencies are the more legitimate institution with respect to science.³

A closer look, however, reveals a more nuanced picture. As noted by scholars in other contexts, extraordinary deference as a general matter stands in tension with the expectation that courts must reinforce administrative-law values like participation, transparency, and deliberation.⁴ Not only do these values reflect

² E.g., Martin Shapiro, Administrative Discretion: The Next Stage, 92 YALE L.J. 1487, 1507 (1983) (“technocrats do understand and judges clearly cannot understand”).
the constitutional design, but they are buttressed by Congress’s intent as expressed in the judicial-review provisions of the Administrative Procedures Act (APA). And unlike the direct relationship between courts and legislatures when statutes are under review and deference is sometimes justified, judicial review of agencies implicates all three branches because courts not only check executive power but also fulfill a signaling function vis-à-vis the legislature. 

Further, administrative agencies cannot place an exclusive claim on science because science plays a legitimizing role throughout government. In other words, suppose an administrative agency were to make a fundamental scientific error that becomes the basis of a regulation. A judicial rule requiring extreme deference—even to blatant scientific errors—would magnify those errors and produce results at loggerheads with the principle of fairness. If we want judicial review to enhance the legitimacy of agency action, we ought to think critically about whether super deference contributes to that end. If fairness and rationality are both furthered when agencies capture the best that science can offer, perhaps a more searching role for the courts—one that encourages agencies’ principled use of science—is called for.

Adding to the intricacies, agency science is a peculiar product quite removed from the traditional image of pure research science. It is laced with policy decisions at numerous levels, a characteristic of hard look review because it ensures agency has truly engaged in reasoned decisionmaking; id. at 763–65 (collecting criticisms).


For a critical analysis of extreme judicial deference to legislative science, see generally Emily Hammond Meazell, Scientific Avoidance: Toward More Principled Judicial Review of Legislative Science, 84 IND. L.J. 239 (2009).

making it susceptible to misuse.\textsuperscript{8} For example, interested parties and agencies alike are incentivized to cloak their policy choices in the seemingly unassailable mantle of science. The occurrence of this phenomenon in agency decisionmaking is well documented. But neither the other branches nor the public are immune from this tendency to mistake policy for science. Calls for “good” or “improved” science in agencies are often motivated by the desire to change policy outcomes rather than agencies’ use of flawed science in reaching them.\textsuperscript{9}

Despite the scholarly literature’s attention to the features of agency science specifically, and the role of judicial review in administrative law generally, there has been no detailed examination of super deference as a principle in its own right.\textsuperscript{10}


\textsuperscript{9} See SHEILA JASANOFF, *SCIENCE ADVISORS AS POLICYMAKERS* 20 (1990) (“Although these controversies seemed on their face to be about science, the alignment of the parties on either side generally conformed to basic political and ideological cleavages between pro- and antiregulation interests in American society.”); Gary Coglianese & Gary E. Marchant, *Shifting Sands: The Limits of Science in Setting Risk Standards*, 152 U. Pa. L. Rev. 1255, 1264 (2004) (“Science has considerable rhetorical appeal when it comes to defending regulatory decisions, as it is often described and perceived as being ‘objective.’”); *Science Charade*, supra note 8, at 1657 (advocates “become single-mindedly engaged in presenting opposing scientific justifications, demanding outside scientific review, or attacking the competence of the agency’s science when it leads to results that run counter to their own unexpressed policy preferences”); Thomas O. McGarity, *Some Thoughts on “Deossifying” the Rulemaking Process*, 41 Duke L.J. 1385, 1400 (1992) [hereinafter Deossifying] (commentators “pick apart the agencies’ preambles and background documents and launch blunderbuss attacks on every detail of the legal and technical bases for the agencies’ rules”).

\textsuperscript{10} Two early commentators criticized the principle in the wake of the modern super-deference case *Baltimore Gas & Electric Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87 (1983), but, of course, could not evaluate
The courts persist in emphasizing it as a reason to avoid becoming too entangled in science during judicial review, yet the few scholarly references are not focused on furthering our understanding of super deference. Two commentators lodged early criticisms in the wake of the modern super-deference case *Baltimore Gas & Electric Co. v. Natural Resources Defense Council, Inc.*, but, of course, could not evaluate how the principle was to be applied in years to come. Otherwise, super deference is sometimes mentioned with criticism, sometimes simply recited as a principle of judicial review, and sometimes mentioned for the role it plays in judicial vacillation between “hard” and “soft” review.

11 462 U.S. 87 (1983). For a detailed discussion of *Baltimore Gas* see infra Part III.B.


13 See, e.g., *Science Charade*, supra note 8, at 1662–66 (arguing super deference contributes to science charade).


This gap in the literature is surprising because the stakes are high. Regarding science specifically, super deference may not be grounded in realistic notions of agency science, it might contribute to ossification and the science charade, and it could have a disparate impact on environmental law. Measured against broader administrative law values, super deference could inhibit transparency; undermine deliberation; fail to accord with

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Separation of Powers and the Requirement of Adequate Reasons for Agency Decisions, 1987 DUKE L.J. 387, 411 (noting vacillation); Donald W. Stever, Jr., Defe

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16 E. Donald Elliott, Strengthening Science’s Voice at EPA, 66 J. L & CONTEMP. PROBS. 45, 47 (2003) (observing that science is “conspicuously absent from internal EPA deliberations”); Steven Goldberg, The Reluctant Embrace: Law and Science in America, 75 GEO. L.J. 1341, 1365 (1987) (“regulatory agencies are regularly accused of being ‘captured’ by industry, consumer groups, members of Congress, or bureaucratic inertia. They are never accused, however, of being captured by scientists.”).


18 Science Charade, supra note 8, at 1662–66 (contending that desire to minimize judicial review incentivizes agencies to deliberately emphasize the scientific aspects of what are ultimately value choices).


20 Science Charade, supra note 8, at 1662–66.
political accountability;\textsuperscript{22} and generally abdicate the courts’ role in the constitutional scheme by encouraging outcome-oriented review.\textsuperscript{23} For these and many other reasons, I contend that super deference has very little utility.

Given this conclusion, one might ask what should replace super deference: how should courts review agency science? A detailed review of how the courts apply super deference reveals that traditional hard-look review can function sufficiently to protect administrative-law values while reflecting our instinctive notions about comparative institutional competence with respect to science. In making this claim, I am aware of a longstanding debate about the efficacy of hard-look generally.\textsuperscript{24} My aim, however, is not so much to enter that debate as to provide a normative account of the courts’ role when reviewing agency science. Indeed, I contend that the courts’ comparative disadvantages with respect to science can actually enhance their role in the constitutional framework. Drawing on insights from political theory, social science, and the broader administrative law discourse, I argue that thoroughly written judicial opinions serve an important function for science in our legal institutions. These opinions, written by generalists, necessarily reflect a generalist understanding of the science and policy issues present in agency decisionmaking. That is as it should be, because in turn they provide important

\begin{enumerate}
\item See Peter H. Schuck & E. Donald Elliott, \textit{To the Chevron Station: An Empirical Study of Federal Administrative Law}, 1990 DUKE L. J. 984 (presenting empirical evidence suggesting that changes in law increasing judicial deference result in more agency decisions being rationalized on the basis that has promoted judicial deference). \textit{But see} Elliott, \textit{supra} note 16, at 51 (arguing judicial review is too “episodic, confused, and inconsistent to have much of a systemative effect on reforming agency practices”).
\item \textit{Judicial Incentives}, \textit{supra} note 15, at 1064 (describing “proliferation of manipulable categories to which different degrees of deference apply”).
\item See Bressman, \textit{Procedures as Politics}, \textit{supra} note 7, at 1766 (stating most views of judicial review fall into two camps: those favoring, and those disfavoring, additional emphasis on agency procedure).
\end{enumerate}
translations for generalist consumers—Congress, the public, the media, and interest groups—that can bring additional political checks to bear on agencies’ decisionmaking.

This Article proceeds in the following parts. Part II lays the descriptive foundation necessary for assessing judicial review of agency science. It begins by outlining the relevant parameters of the APA, calling attention to the spectrum of scrutiny that courts bring to bear as they examine agencies for reasoned decisionmaking. Next, it highlights the importance of the record on review, paying special attention to the science-specific features of such a record. This leads to a discussion of science in agencies generally. As we shall see, science is laced with policy even in the stereotypical, research-type setting; all the more so when developed as a tool for agency action. Part III draws on the understanding developed in the previous section to locate the modern super-deference case, *Baltimore Gas*, in its historical and contextual place. A detailed look at the courts’ subsequent treatment of super deference ensues, demonstrating that the principle has largely lost its teeth. Yet as Part IV argues, this rich array of science-based case law provides a basis for thinking critically about the institutional role courts play with respect to agency science. Courts are using their generalist approach in a way beneficial to administrative-law as well as science values. As a normative matter, this model provides a way to gage the courts’ effectiveness when confronted with agency science.

II. **Background Principles: Agency Science in the Courts**

Before assessing the role of super deference, I take up several foundational matters. First, the APA-driven structure of judicial review of agency science provides the background upon which super deference is built. Second, the roles of science and policy in

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agency decisionmaking foreshadow the conceptual weaknesses in
super deference. Finally, there are some special problems in
administrative law that have particular relevance to review of
agency science. This background will prove useful in later
assessing super deference and developing a different
conceptualization of agency science.

A. Judicial Review Under the APA

When courts review agency science, they are operating within
the parameters set forth in the APA. As they have done with many
other legislative enactments, the courts provide meaning to the
terms they encounter. The discussion below describes the basic
APA contours relevant to judicial review of agencies’ scientific
findings, including the judicial gloss applied to those provisions.
While judicial review generally imposes a “reasoned
decisionmaking” requirement on agencies, “reasonable” is a
flexible term. The range of that term’s meaning is reflected in the
case law, covering a spectrum defined by “hard look” review and
the Baltimore Gas super-deference principle at opposing ends.
Regardless of how strictly a court reviews an agency, it does so on
the basis of a record, the attributes of which are described below.

1. APA Basics

The starting place for judicial review of administrative
agencies is § 706 of the APA. In particular, the provisions that
implicate agencies’ scientific findings, as well as the policy
decisions made in light of scientific uncertainty, are §§ 706(A) and
(E). These subsections require the reviewing court to “hold
unlawful and set aside agency action, findings, and conclusions
found to be—

(A) arbitrary, capricious, an abuse of discretion, or
otherwise not in accordance with law;

....
(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute. . . . 

While subsection (E) applies by its terms only to “formal” rulemaking and adjudication—that is, proceedings that produce a closed, trial-like record—subsection (A) serves as a catch-all standard that generally applies, for purposes within the scope of this Article, to review of informal adjudication and rulemaking.

Whether an agency is engaging in rulemaking or adjudication, formal or informal, the agency will base its decisionmaking on factual information and policy choices. When agencies must act in the scientific arena, the factual information will include scientific

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27 Another possibly relevant subsection is § 706(2)(C) (relating to agency action “in excess of statutory jurisdiction, authority, limitations, or short of statutory right”), which may be implicated when courts review agencies’ interpretation of their statutory mandates and apply the Chevron doctrine. See Chevron USA, Inc. v. Natural Res. Def. Council, 467 U.S. 837 (1984). Although consideration of the Chevron doctrine would also yield policy decisions made in light of scientific uncertainty, the statutory-interpretation basis for applying Chevron sets that doctrine beyond the scope of this Article. Cf. Lisa Schultz Bressman, Chevron’s Mistake, 58 DUKEL.J. 549, 585 (2009) (“the effect of each is the same”). Nevertheless, Chevron has a great deal to say about the relationship between courts and agencies generally, and to that extent, I draw on Chevron for support. See, e.g., 467 U.S. at 865 (“Judges are not experts in the field, and are not part of either political branch of the Government. . . . While agencies are not directly accountable to the people, the Chief Executive is, and it is entirely appropriate for this political branch of the Government to make such policy choices . . . .”).
knowledge and the policy choices will necessarily represent decisions made in light of scientific uncertainty. Although the formality of the agency action will dictate which of the above standards applies, in practice the two standards are largely indistinguishable for purposes of judicial review. At essence, each simply requires reasonableness. The agency must explain its decision in a reasonable way and the court may not substitute its judgment for that of the agency. Notably, courts will not supply a reasoned basis for an agency’s action. The reasonableness standard is thus meant to help ensure that the agency has acted with deliberation by considering its action in a careful, logical way.

This “reasoned decisionmaking” requirement pervades administrative law. The simplicity of the phrase itself, however,

30 See Ass’n of Data Processing, 745 F.2d at 683 (D.C. Cir. 1984) (Scalia, J.) (substantial evidence standard separately recited in the APA “not to establish a more rigorous standard of factual support but to emphasize that in the case of formal proceedings, the factual support must be found in the closed record as opposed to elsewhere).

31 Overton Park, 401 U.S. at 416 (“Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency.”) (arbitrary and capricious); see also Univ. Camera Corp v. NLRB, 340 U.S. 474, 488 (1951) (court may not “displace” agency’s “choice between two conflicting views, even though the court would justifiably have made a different choice had the matter been before it de novo”) (substantial evidence). As described in Overton Park, the arbitrary-and-capricious standard requires ensuring that agencies have made a decision “based on a consideration of the relevant factors” without “clear error of judgment.” 401 U.S. at 416. Substantial evidence, on the other hand, means “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” Consol. Edison Co v. NLRB, 305 U.S. 197, 217 (1938); see also Univ. Camera, 340 U.S. at 487–88 (1951) (APA requires reviewing courts to consider whole record to ascertain substantiality).


33 See Bressman, Procedures as Politics, supra note 7, at 1778 (“The standard legal justification for the reasoned decisionmaking requirement is that it promotes rationality, deliberation, and accountability.”).

34 See Greater Boston Television Corp. v. FCC, 444 F.2d 841, 850–51 (D.C. Cir. 1970) (using term “reasoned decision-making”).
misleadingly masks the nuances it has received in application. It is used to describe judicial review ranging from the searching “hard-
look” doctrine to the highly deferential super-deference principle itself.

For example, a representation of the hard-look doctrine is embodied in the famous language from *Motor Vehicle Manufacturers Ass’n v. State Farm Mutual Automobile Insurance*: 35

Normally, an agency rule would be arbitrary and capricious if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise. 36

*State Farm*, in which the Court struck down an agency’s rescission of passive-restraint regulations for automobiles, has been called “a strong endorsement of quite aggressive judicial review of agency action.” 37 It is characterized by its extremely detailed and critical discussion of the agency’s reasoning, though its remedy—a remand to the agency to explain itself anew—is typical. 38

Just prior to *State Farm*, however, the Supreme Court handed down *Baltimore Gas* and announced the modern super-deference

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36. *Id.* at 43.
38. See 463 U.S. at 57.
principle, all within the rubric of “reasoned decision-making.”

As described more fully below, that case involved a National Environmental Policy Act (NEPA) challenge to the Nuclear Regulatory Commission’s (NRC’s) decision to treat nuclear-waste disposal issues generically for purposes of licensing individual nuclear power plants. The generic assumption at the root of the challenge was that the resulting nuclear waste could be stored in such a way as to eliminate any releases of radioactive material. In upholding this “zero-release” assumption, the Court emphasized that:

[A] reviewing court must remember that the Commission is making predictions, within its special area of expertise, at the frontiers of science. When examining this kind of scientific determination, as opposed to simple findings of fact, a reviewing court must generally be at its most deferential.

Thus exists a spectrum of deference within the umbrella of “reasonableness.” While later sections provide a discussion of the problems associated with singling out science for the special, super-deferential end of the spectrum, I note at this juncture that the Court’s mixed signals as to the meaning of “reasoned decisionmaking” generally has perplexed many administrative-law observers. Even so, some broad principles do frame the discussion. To summarize thus far, the context for evaluating judicial review of agency science may reflect either review for arbitrariness or review

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41 Id. (describing the “zero-release” assumption).
42 Id. at 103.
43 See infra n.15 (collecting sources).
for substantial evidence. In either case, courts will look for reasoned decisionmaking (although this standard appears flexible to say the least). Two further points are relevant here. First, some courts apply a different formulation to mixed questions of law and fact on review of formal agency proceedings. That formulation, expressed in the pre-APA opinion *NLRB v. Hearst Publications*, asks whether the agency’s action has “warrant in the record” and “a reasonable basis in law.” Again, the hallmark of this test is reasonableness. Second, some agencies’ statutory mandates specify substantial evidence as the governing standard and may set forth additional substantive standards. For purposes of the discussion that follows, I will note any particular nuances that may alter the standard of review, but otherwise the cross-cutting, deferential reasonableness approach enables us to focus on the particular scientific and policy decisions at issue in a wide range of examples.

2. The Record on Review

What science do courts have before them when they engage in a reasonableness review agency actions? The general principle, applicable in scientific cases as well as others, is that courts are limited to the record produced at the agency itself. Thus, even if an agency is not required to undertake a formal decisionmaking process (which would generate a closed record), a reviewing court will consider the record that was before the agency at the time it

44 322 U.S. 111 (1944).
45 Id. at 131.
47 *Overton Park*, 401 U.S. at 420; see Administrative Procedure Act, 5 U.S.C. § 706 (2006) (“in making the foregoing determinations, the court shall review the whole record or those parts of it cited by a party”).
made its decision to test for reasonableness. Further, a court should normally not take evidence additional to the record when confronting a challenge to agency action.\textsuperscript{48} This important feature distinguishes administrative law from other proceedings that arise in courts where science may be at issue; unlike the typical trial scenario, courts reviewing agencies normally do not engage in any de novo examinations of science.

The record requirement is justified for its role in enhancing accountability and transparency. Yet agencies’ records might consist of thousands of pages of information.\textsuperscript{49} Where science is at issue, the record may include expert affidavits, letters from scientific and other interested organizations, published and unpublished scientific studies, scientific data produced or compiled by the agency or other agencies, and scientists’ and policymakers’ assessments of all the foregoing.\textsuperscript{50} Fundamentally, the record compiled by the agency is of utmost importance because that is what a reviewing court will scrutinize on science-based challenges. In combination, the reasoned decisionmaking and record requirements are meant to enhance the legitimizing administrative-law values of deliberation, accountability, and transparency.

\textsuperscript{48} There are some narrow exceptions. For example, if a proponent alleges an agency ignored a significant aspect of the problem, that proponent may seek to have evidence admitted that would be relevant to the agency’s failings. \textit{See, e.g.}, Nat’l Audubon Soc’y v. U.S. Forest Serv., 46 F.3d 1437, 1447 (9th Cir. 1992) (describing exceptions to record evidence rule). That evidence would be subject to the principles set forth in \textit{Daubert v. Merrell Dow Pharmaceuticals, Inc.}, 509 U.S. 479 (1993). \textit{See, e.g.}, Hells Canyon Preservation Council v. Jacoby, 9 F. Supp. 2d 1216, 1223–24 (D. Or. 1998) (applying \textit{Daubert} to extra-record evidence).


\textsuperscript{50} For a discussion of how agencies generate this science, see \textit{infra} PART II.B.1.
B. Constructing the Record: The Scientific Enterprise in Agencies

If a record is to support science-informed agency action, that record must include science. But science in agencies is far removed from the stereotypical academic research setting. Although traditional science is infused with policy decisions, agency science is even more so because it is conducted for different purposes. Using concrete examples, this section briefly describes where those policy decisions fit in the scientific decisionmaking process generally. Next, this section focuses more specifically on common sources of agency science, which support the notion that science in agencies is a unique construct. The bottom line is that where there is scientific uncertainty, policy must fill the gap, even more in agencies than in the “pure” scientific community. As discussed later, these attributes have important implications for judicial review of agency science.

1. The Role of Policy in Science

At first blush, it may seem odd to think of science as being intertwined with policy. Science is commonly understood as a methodology: one makes observations; forms a hypothesis to explain those observations; devises experiments to test the hypothesis; and revises the hypothesis in a continuing cycle.\(^{51}\) Theories are hypotheses that have withstood significant testing, while facts are simply the observations or measurements of natural

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\(^{51}\) NAT’L ACADEMIES PRESS, RESPONSIBLE SCIENCE VOLUME I: ENSURING THE INTEGRITY OF THE RESEARCH PROCESS 38 (1992) [hereinafter RESPONSIBLE SCIENCE]; cf. THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 36–42, 52 (3d ed. 1996) (describing normal science as puzzle-solving, cumulative exercise that ultimately leads to paradigm shifts). But see SUSAN HAACK, DEFENDING SCIENCE—WITHIN REASON 23 (2007) (arguing science is not epistemologically privileged because these are standards by which we judge “all inquirers, detectives, historians, investigative journalists, etc., as well as scientists”).
or experimental phenomena. The role of policy, however, begins to become apparent when one remembers that these characteristics described only a process; there is no gleaming “right answer” at the end of an experiment, and there is no ultimate truth waiting to be uncovered.

This feature of science is widely overlooked. But legal institutions and the citizenry at large suffer from a science obsession, assuming that if only we had answers from science, we would know what regulatory decisions are “correct.” Certainly, our institutions ought to do their best to incorporate good science into decisionmaking, but the ultimate decisions that must be made are policy choices. Not only that, but policy informs everything from how an experiment is designed to how results are interpreted and communicated. I find it helpful to characterize the necessary policy decisions as falling in any of three categories: metapolicy choices, which relate to ultimate decisions; mesopolicy choices, which relate to interpretive and communicative decisions; and protopolicy choices, which relate to interstitial decisions like experiment design. Taken together, the science and the policy

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52 RESPONSIBLE SCIENCE, supra note 51, at 38.
53 Id. (“Although [science’s] goal is to approach true explanations as closely as possible, its investigators claim no final or permanent explanatory truths. Science changes. It evolves. Verifiable facts always take precedence.”).
54 See generally Daniel Sarewitz, The Rightful Place of Science, ISSUES IN SCI. & TECH. 89 (Summer 2009) (collecting examples from early in the Obama administration); Meazell, supra note 6, at 251 (collecting sources); Gary Cogliano & Gary E. Marchant, Shifting Sands: The Limits of Science in Setting Risk Standards, 152 U. PA. L. REV. 1255, 1260 (2004) (“In short, EPA’s use of a science-based rhetoric enabled it to avoid responsibility for providing any clear, consistent reasons for its policy choices in setting air quality standards.”).
55 I define “policy” broadly to include courses of action selected from amongst alternatives in light of such factors as professional judgment, institutional and cultural norms, and external pressures.
56 Professor Wagner has illustrated similar concepts in what she terms “the zigzag between science and science policy.” Wendy E. Wagner, The “Bad Science” Fiction: Reclaiming the Debate Over the Role of Science in Public
choices comprise an agency’s scientific determination—and as will be discussed later, litigation directed at agency science typically involves challenges to these political choices, rather than science.

Metapolicy describes the ultimate regulatory decision made in light of scientific uncertainty; it is informed by scientific information (some types of which I describe below) but is shaped by the normative goals of statutory mandates as well as political pressures. Metapolicy describes the ultimate regulatory decision made in light of scientific uncertainty; it is informed by scientific information (some types of which I describe below) but is shaped by the normative goals of statutory mandates as well as political pressures. A regulation is the paradigmatic example of metapolicymaking. For example, when the Occupational Safety and Health Administration (OSHA) sets a workplace exposure limit, it might have assessed a number of toxicological studies that frame results in probabilistic terms. But none of those studies gives an answer to the question of what the best limit is. Rather, OSHA must consider the goals of its statutory mandate, the current administration’s policy goals, cost-benefit implications, and the like in addition to the limited scientific information in coming up with a single number that regulates workplace exposure.

If the ultimate regulatory decision is metapolicy, the decision about how to interpret and communicate scientific findings is an intermediate step, hence the term mesopolicy. Consider this example. Science is uncertain about the effects on human health

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57 Holly Doremus, Science Plays Defense: Natural Resource Management in the Bush Administration, 32 ECOLOGY L.Q. 249, 290 (2005) (“Political choices cannot be removed from the process. Instead of trying to remove them, it would be more helpful to focus on making the political elements of these decisions more transparent.”).

58 This example is based on Industrial Union Department v. American Petroleum Institute, 448 U.S. 607 (1980), discussed infra text accompanying notes 164-173.


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associated with very low levels of radioactive exposure. The same body of data has led scientists to three reasonable, but divergent conclusions. First, it may be that adverse health effects increase proportionally with increasing levels of exposure, regardless of the level of exposure. Second, it may be that very few adverse health impacts are seen at low levels, until the exposure reaches some boundary amount that causes significant and increasing adverse health effects. Finally, it may be that low levels of exposure cause adverse health impacts, but those impacts do not increase significantly increase with increasing levels of exposure. The point is not which of these is correct; the point is that reasonable scientists, exercising scientific judgment, will disagree on how to interpret and communicate the very same set of data.

Finally, protopolicy refers to the judgments scientists make while conducting science. These might be decisions about such things as what to include or exclude in an experiment, what parameters to set for a model, the choice of measurement techniques, or intentional or even unknowing assumptions. The

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60 In his pathbreaking work, nuclear physicist Alvin M. Weinberg coined the term “trans-science” to describe questions that, while capable of being posed in scientific terminology, “are unanswerable by science; they transcend science.” Alvin M. Weinberg, Science and Trans-Science, 10 MINERVA 209, 209 (Apr. 1972). Examples of trans-scientific questions stem from his work in the nuclear industry and include the biological effects of very low-dose contaminant exposures; the probability of extremely improbable events; the judgments that must be used to make decisions when thorough data is unavailable; or value choices between different types of science. See id. at 210–13.


62 Doremus, supra note 14, at 1624 (“Scientific integrity allows for the honest difference of opinion.”).

63 See Barbara Cosens, Resolving Conflict in Non-Ideal, Complex Systems: Solutions for the Law-Science Breakdown in Environmental and Natural Resource Law, 48 NATURAL RES. J. 257, 291 (2008) (“this is a fundamental aspect of the scientific study of complex, non-ideal systems”).
scientific method does not reveal the “right” choices to make at these junctures; these types of issues transcend science and represent interstitial policy choices. Consider, for example, a study to determine whether contaminant levels in a stream are likely to exceed a regulatory standard. Where little empirical information is available about the stream, the logic of Bayes’ theorem might prove useful for inductively assessing that probability. Bayes’ theorem, however, requires an initial scientific judgment about the system being studied, or the “prior distribution.” In the stream example, an industry scientist might assume the prior distribution involves low concentrations of the contaminant; by applying Bayes’ theorem to a limited number of actual samples, the result would suggest that the most probable mean contaminant levels would fall below the regulatory standard. A scientist from an environmental group, on the other hand, might assume a higher prior distribution that results in the most probable mean exceeding the regulatory standard.

In providing these examples, I do not mean to suggest there is anything inherently wrong with these policy choices. To the contrary, they cannot be avoided. And good scientific practice involves documenting those choices, thereby providing transparency and accountability because those results can then be tested and the quest for scientific knowledge refined. It may not

64 For a detailed presentation of this example, see David E. Adelman, Two Models for Scientific Inquiry, in RESCUING SCIENCE, supra note 8, at 201–03.
65 Id. at 201.
66 Id. at 202.
67 Id. Ultimately, sufficient sampling and testing should make the Bayesian predictions from these two approaches converge.
68 By contrast, scholars have documented policy-driven abuses of the scientific process itself. See, e.g., Doremus, supra note 14, at 1609–13 (describing censorship of scientific information); Wagner, Science Charade, supra note 8, at 1640–50 (describing intentional and premeditated instances of science charade).
69 See Adelman, supra note 64, at 212 (“Careful explanation of experimental results is a fundamental principle of science.”).
be possible to isolate every policy decision that has been made, but to the extent one can identify specific junctures that involve policy, the norms of the scientific community encourage that disclosure. This is fortuitous for observers of administrative law, because the legitimizing values of transparency and accountability provide axes on which administrative-law and scientific values are aligned.

Given that agencies are tasked with making policy decisions and must do so using data that is already laced with policy, it is not surprising that their scientific records can be very diverse. Although some agencies do conduct their own research, most information is collected and synthesized from outside sources. During the rulemaking process, for example, agencies ask the public to provide any relevant scientific information. Agencies

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70 Cosens, supra note 63, at 292 (“[L]aw, agency policy, and scientific judgment may all play a role in reaching a single decision. Separating them for the sake of transparency, as recommended by some, may not be so easily done.”).

71 See Jasanoff, supra note 9, at 77 (“regulatory science includes a substantial component of knowledge synthesis”) (italics omitted); Mary Jane Angelo, Harnessing the Power of Science in Environmental Law: Why We Should, Why We Don’t, and How We Can, 86 Tex. L. Rev. 1527, 1565 (2008) (“EPA gets most of its scientific information from outside of the agency”); Thomas O. McGarity, The Complimentary Roles of Common Law Courts and Federal Agencies in Producing and Using Policy-Relevant Scientific Information, 37 Envtl. L. 1027, 1028–29 (2007) (“The agencies have become repositories for huge amounts of scientific information that they may use in taking regulatory action or disseminate to the public by way of warnings or cautionary statements.”); cf. J.B. Ruhl & James Salzman, In Defense of Regulatory Peer Review, 84 Wash. U. L. Rev. 1, 6 (2006) (advocating regulatory peer review for the “outside evaluation of an administrative agency’s compilation, selection, or use of scientific data to support a proposed regulatory decision such as a rule, standard, permit, or other policy”).

sometimes fund studies or work under cooperative agreements to develop data.\textsuperscript{73} Many have internal peer review policies\textsuperscript{74} and science advisory consulting requirements.\textsuperscript{75}

All of this information ultimately comprises the record—recall that for informal decisionmaking purposes, “record” is defined as everything the agency had before it when it made its decision. But I emphasize that agency science, and thus the record in which it is reflected, are different from pure research science because the purpose is to “further the task of policy development.”\textsuperscript{76} As a matter of institutional design, government, interest groups, and regulated entities are heavily involved in the production and scrutiny of scientific information. Numerous non-scientific internal and external demands on agencies may impact the regulatory science, from imposing strict timetables to impacting various meso- and protopolicy determinations.\textsuperscript{77}

These characteristics relate to the typical justifications for deferential review of agency science, which tend to focus on the policymaking role bestowed upon the executive branch generally by the Constitution;\textsuperscript{78} the policymaking role bestowed on agencies

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\item \textsuperscript{73} EPA Guidelines, \textit{supra} note 72, at 6-7.
\item \textsuperscript{74} See, e.g., EPA Guidelines at 11 (describing peer review system); Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy for Peer Review in the Endangered Species Act Activities, 59 Fed. Reg. 34,270, 34,270 (July 1, 1994).
\item \textsuperscript{75} E.g., EPA Guidelines at 19; see also Holly Doremus, \textit{Data Gaps in Natural Resource Management: Sniffing for Leaks Along the Information Pipeline}, 83 \textit{Ind. L. J.} 407 (2008) (exploring process by which scientific and technical information is produced, expressed, transmitted, and ultimately incorporated into regulatory decisions).
\item \textsuperscript{76} JASANOFF, \textit{supra} note 9, at 77. Professor Jasanoff has identified numerous differences between regulatory and research science; for a helpful summary, see \emph{id.} at 80.
\item \textsuperscript{77} See \emph{id.} at 76–70 (exploring such differences).
\item \textsuperscript{78} Chevron USA, Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837, 865 (1984) (“[w]hile agencies are not directly accountable to the people, the Chief
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specifically by Congress; and the participatory elements of agency decisionmaking that enable agencies to at least have before them far more scientific information that would a court. Add to that mix an assumption that agencies are more qualified than courts to process scientific information, and these attributes support what Professor Jasanoff has called the “science policy paradigm.” That is: (1) agencies should be able to make decisions even on the basis of imperfect knowledge; (2) a scientific determination may be considered valid even if there is not universal scientific consensus to that effect; and (3) when experts disagree about the science, agencies should have the authority to choose a position consistent with its statutory mandate.

2. Challenges to Agency Science

The above discussion highlights a glaring question: what should a court do if an agency gets science wrong? As it turns out, the premise of that question—that administrative-law litigation

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79 Balt. Gas & Electric Co. v. Natural Res. Def. Council, Inc., 462 U.S. 87, 97 (1983) (“[r]esolution of these fundamental policy questions likes, however, with Congress and the agencies to which Congress has delegated authority”).

80 Administrative Procedure Act, 5 U.S.C. § 553(c) (2006) (“the agency shall give interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments”); see also Chevron, 467 U.S. at 865 (“The arguments over policy that are advanced in the parties’ briefs create the impression that respondents are now waging in a judicial forum a specific policy battle which they ultimately lost in the agency . . . . Such policy arguments are more properly addressed to legislators or administrators, not to judges.”).

81 JASANOFF, supra note 9, at 50; see also Cellular Phone Task Force v. FCC, 205 F.3d 82, 91 (2d Cir. 2000) (rejecting challenge to FCC safety guidelines for radio frequency radiation: “The argument that the FCC should create greater safety margins in its guidelines to account for uncertain data is a policy question, not a legal one. As a policy matter, an agency confronted with scientific uncertainty has some leeway to resolve that uncertainty by means of more regulation or less.”)
involves challenges to positive science—is belied by our later examination of the super-deference case law.\textsuperscript{82} Rather, most judicial challenges involve nitpicking at the proto- and mesopolitical levels; these are more easily characterized as “scientific” decisions because they take place when science is being conducted, and hence they seem more amenable to judicial scrutiny, than to, say, metapolitical decisions.\textsuperscript{83}

To further illustrate, it is helpful to consider the key features of litigation involving agency science. Typically, interest groups act as watchdogs to assess agency decisions against the particular groups’ policy preferences. To be sure, these groups monitor agencies and participate in agency lawmaking long before an action is final and subject to judicial review. But when a final decision runs counter to a group’s policy preferences, a judicial challenge may be the next step.

Although the decision being challenged is likely one of policy, the hallmark of these lawsuits is the challenger’s obsession with the scientific underpinnings of the agency’s decision. The textbook approach is to argue that an agency used “bad science”—that it ignored important scientific studies, that the agency’s own science involved flawed methodologies, that the agency did not do enough science, or that the science somehow dictated a different conclusion—in essence, that if the science had been “right,” a different outcome would have resulted.

That route is sometimes successful—if for different reasons. For example, if an agency actually does ignore important studies, rely on seriously flawed methodology, or reach a conclusion that seems at odds with the relevant science, \textit{and it fails to explain itself}

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\item[(82)] See infra PART III.C.
\item[(83)] For other accounts of this observation, see Wagner, \textit{Science Charade}, supra note 8, at 1657 (advocates “become single-mindedly engaged in presenting opposing scientific justifications, demanding outside scientific review, or attacking the competence of the agency’s science when it leads to results that run counter to their own unexpressed policy preferences”); McGarity, Deossifying, \textit{supra} note 9, at (commentators “pick apart the agencies’ preambles and background documents and launch blunderbuss attacks on every detail of the legal and technical bases for the agencies’ rules”).
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in a reasoned manner, it may well face a remand. This result is simply consistent with the reasoned decisionmaking requirement. If the record is fundamentally flawed, it is rightfully susceptible to a challenge, regardless whether the record contains scientific information. At their core, the cases that are most often cited as examples of “bad” agency science are usually explained on the above basis, or are simply cases involving metapolicy with which the speaker disagrees. Indeed, as Professor Wagner has exhaustively demonstrated, there are very few examples if agencies actually getting positive science wrong.

Yet these observations do not suggest super deference is justified. Rather, they support a role for the courts consistent with the basic principles of reasoned decisionmaking: while a court may not substitute its judgment for an agency, it ought to make ensure the agency has acted reasonably. If courts fall prey to the science obsession and give too shallow a look at agency science,

84 See, e.g., Chlorine Chemistry Council v. EPA, 206 F.3d 1286 (D.C. Cir 2000) (remanding to agency where, pursuant to Safe Drinking Water Act, EPA set maximum contaminant levels for chloroform at zero despite widespread scientific consensus that exposure thresholds had been demonstrated for chloroform).

85 For example, the leading proponents of applying the principles of Daubert v. Merrell Dow Pharmaceuticals Co., 509 U.S. 479 (1993) to judicial review of administrative law cite the following as examples of bad agency science: Flue-Cured Tobacco Cooperative v. EPA, 4 F. Supp. 2d 435 (M.D.N.C. 1998), rev’d, 313 F.3d 852 (4th Cir. 2002); Chemical Manufacturers Ass’n v. EPA, 28 F.3d 1259 (D.C. Cir. 1994); and Puerto Rico Sun Oil Co. v. EPA, 8 F.3d 73 (1st Cir. 1993). See Alan Charles Raul & Julie Zampe Dwyer, “Regulatory Daubert”: A Proposal to Enhance Judicial Review of Agency Science by Incorporating Daubert Principles Into Administrative Law, 66 LAW & CONTEMP. PROBS. 19–20 (2003). In only one of those, Chemical Manufacturer’s Ass’n, did the agency actually get the science wrong: it treated a gas molecule as if it were not really a gas. 28 F.3d at 1266. The other cases may be explained on the basis that the agencies did not engage in reasoned decisionmaking—not that science was “bad.”

86 Wagner, Bad Science Fiction, supra note 56, at 72–87; see also McGarity, Our Science, supra note 59, at 934 (“there is little evidence that the scientific information that the agencies are currently using and disseminating is unreliable”).
they risk missing not just the rare mistake of positive science, but the failures of reason Congress has tasked them with identifying. Further, even if agencies do relatively well with positive science, administrative law contains some “trouble spots” that have particular ramifications for judicial review of agency science. Any analysis of super deference, therefore, would be remiss if it failed to consider those particular issues both as background building blocks and as normative guideposts—a task to which I now turn.

C. Ossification, the Science Charade, and the Good Science Movement

Three recurring issues of science in administrative law inform the critique of super deference: ossification, the science charade, and the good science movement. Taking each in turn, I show that super deference has the potential to deepen problems that are present more broadly in administrative law, and to particularly undermine the goal of incentivizing scientific transparency, accountability, and deliberation within the agencies.

1. Ossification

The ossification hypothesis posits that, among other things, intrusive standards of judicial review make informal rulemaking increasingly burdensome and unattractive to agencies.\[87\] This

\[87\] The term is credited to Professor E. Donald Elliot, former General Counsel to the EPA. See Elliott et al., *Science, Agencies, and the Courts: Is Three a Crowd?*, 31 ENVTL. L. REPORTER 10,125 (2001) (comments of Thomas O. McGarity). Whether judicial review causes ossification is hotly contested. There are many supporters of the hypothesis. E.g., STEPHEN BREYER, *BREAKING THE VICIOUS CIRCLE—TOWARD EFFECTIVE RISK REGULATION* 48 (1993); Thomas O. McGarity, *Ossification, supra* note 17, at 528 (“the courts have played a prominent role in the ossification of rulemaking”); Richard J. Pierce, Jr., *Seven Ways to Deossify Agency Rulemaking*, 47 ADMIN. L. REV. 59, 65 (1995) (“With the exception of a few agencies, the judicial branch is responsible for most of the ossification of the rulemaking process.”); Richard J. Pierce, Jr., *Two Problems in Administrative Law: Political Polarity on the
undermines administrative-law values because it incentivizes agencies to choose other, less participatory regulatory methods.\textsuperscript{88} With respect to science specifically, the concern is that overly stringent judicial review causes excessive gathering of scientific data and drawn-out analyses.\textsuperscript{89} Essentially, agencies will make every effort to ensure a thorough record that can withstand review the first time around, resulting in an overly slow process.\textsuperscript{90} This particular prediction, focused on science, would be quite difficult to test empirically, and it does not appear to have been so tested.\textsuperscript{91} Nevertheless, it seems a matter of common sense that agencies are mindful of the possibility of judicial review for major rulemakings, and would approach rulemaking more deliberately.

At first blush, it seems that super deference might contribute to deossification, at least at the margins. If super deference means courts will not take a hard look at agency science, agencies should not feel compelled to amass the volumes of supporting scientific


\textsuperscript{88} McGarity, \textit{Deossifying, supra} note 9, at 1386.

\textsuperscript{89} Jordan, \textit{supra} note 87, at 395.

\textsuperscript{90} McGarity, \textit{Deossifying, supra} note 9, at 1400; \textit{see also id.} at 1401 (“The courts can also impose analytical requirements in a more direct way by reading into agency statutes analytical obligations not obvious in Congress’s words.”).

\textsuperscript{91} Jordan, \textit{supra} note 87, at 395.
materials that they normally would in order to justify their decisions. There are at least two problems with this prediction, however. First, as I demonstrate below, super deference lacks enough guiding principles to be predictable. Moreover, the prevalence of the hard-look approach would likely incentivize agencies to err on the side of more, not less, scientific record-building at the decisionmaking stage.

Second, super deference could provide a counter-incentive dangerous to both the ossification problem and general administrative law values: if agencies know scientific determinations get the most deference, they might logically increase the amounts of scientific data underpinning their decisions to ensure those decisions will be classified by the courts as “scientific determinations.” Indeed, early criticisms of *Baltimore Gas* made this very point.\(^92\) This approach does nothing to further transparency, as it obfuscates the true bases for decisions. Nor does it further participation; if the public is already daunted by the amount of science in agency decisionmaking, more and unnecessary science surely does not help.

2. *The Science Charade*

Relatedly, the “science charade” posits that agencies cloak policy decisions in a shroud of science, exaggerating the role of science to the detriment of administrative law values, statutory goals, and science itself.\(^93\) As Professor Wagner explained in her illuminating work on toxic risk regulation, agency scientists and bureaucrats fail to identify the gaps left by uncertain science or to reveal the policy choices made to fill those gaps.\(^94\) This might take the form of agency scientists searching indefinitely for scientific answers that do not exist; or of scientists inserting their own policy choices into their analyses but characterizing their results as based

\(^92\) *See infra* text accompanying note 178.
\(^93\) The classic account is Professor Wagner’s *Science Charade*, *supra* note 8.
\(^94\) *Id.* at 1629.
on science. The science charade might also involve intentional or even premeditated characterizations of decisions as based in science even if those decisions are really somewhat arbitrary. These behaviors undercut transparency because they do not make clear precisely how an agency reached its decision. They also hinder participation and accountability because they drown policy choices in inaccessible science.

Several legal incentives have been blamed for the charade, the most important for our purposes being the parameters of judicial review. As explained previously, the reasoned decisionmaking requirement means that courts expect agencies to explain their decisions in a reasonable way. They must therefore support their scientific decisions with scientific evidence. There is some interplay with the ossification hypothesis here: if agencies know courts will look for scientific explanations for scientific determinations, the agencies are incentivized to err on the side of amassing volumes of science on the record. This leads to underrepresentation of the myriad policy decisions being made, which are not scientific and thus do not seem to support scientific determinations. In reality, this criticism runs to the courts as much as the agencies, because it presumes that generalist judges are unable to grasp that policy decisions are deeply embedded in science and agency decisionmaking. Nevertheless, there is no general requirement that agencies distinguish between science and policy.

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95 Id. at 1632.
96 Id. at 1640, 1644.
97 See id. at 1674–77.
98 Other possibilities include the public participation requirement of the APA, id. at 1654, perverse incentives set up through interest group oversight, id. at 1657, and science-based legislative mandates, id. at 1667.
99 There has been some suggestion that agencies are punished if they make explicit that they have made policy choices in light of scientific uncertainty. See Science Charade, supra note 8, at 1663 & n.183. But in light of the super-deference principle’s grounding in the Court’s view that agencies are the appropriate policymaking branch—and the Baltimore Gas facts itself, in which the agency was forthcoming about scientific uncertainty and policy—it seems
Like its impact on ossification, super deference would seemingly contribute to the science charade. If agencies know that courts will be at their most deferential when reviewing scientific determinations, they will rationally emphasize the scientific aspects of their decisions to the detriment of clearly identifying the policy decisions filling the scientific gaps.\footnote{100}

3. The Good Science Movement

As previously noted, most judicial challenges to agency science are directed not so much at the science as at the meta-, meso-, and protopolitical decisions embedded in such science. Nevertheless, these challenges are often packaged as science challenges, such that agencies have not been immune to the concerns about junk science in the legal system. In the courts, the junk science debate culminated in \textit{Daubert v. Merrell Dow Pharmaceuticals Co.} \footnote{101} In the agencies, \textit{Daubert} has likewise become the metaphor for “good science.” Proposals (and some reforms) have targeted the agencies themselves,\footnote{102} executive oversight,\footnote{103} and judicial review.\footnote{104} There has been much debate that other factors may better explain remands even where agencies have been explicit. Indeed, Professor Bressman has explained the remand in \textit{State Farm} as being influenced by the Court’s perception that the agency needed to make explicit the political factors influencing its decision. Bressman, \textit{Procedures as Politics}, supra note 7, at 1783 (“One message to the agency was to better cloak its politically based decisions in technical dress. Another was to reveal the political as well as the technical basis for its decision.”).

\footnote{106} \textit{See Science Charade}, supra note 8, at 1665–66 (“By insisting on technical justifications on the one hand and pledging not to scrutinize the accuracy of the technical explanations on the other, the courts not only fail to prevent the science charade, they make it almost obligatory.”).

\footnote{101} 509 U.S. 479 (1993).


on the merits of these proposals, and there remains the more important question whether such reforms are necessary in the first place.

Still, most people can probably agree that judicial review ought to reinforce an agency’s use of good science as much as possible, while avoiding the tendency to legitimize “bad” science. In other words, we want our judicial outcomes, as much as our substantive administrative law, to capture the state of science as accurately as possible. Thus, judicial review of agency science ought to maximize good science while also maximizing administrative-law values. Related to the science charade, legal rules ought to seek ways to improve transparency so that science-based policy challenges can be unveiled and examined for what they really are.

With these points in mind, I highlight one proposed “good science” reform for its marked contrast to super deference: regulatory *Daubert*. Proponents of this approach argue that courts should engage in *Daubert*-like scrutiny of agency science on judicial review. According to proponents of Daubertized


Merits, and criticisms, have been extensively debated in the scholarly literature. See generally Wagner, “*Bad Science*” Fiction, supra note 56 (criticizing reforms and questioning premise of bad science).


E.g., Raul & Dwyer, supra note 84, at 7 (“*Daubert* provides a suitable framework for reviewing the quality of agency science and the soundness of agency decisions”); Paul S. Miller & Bert W. Rein, “Gatekeeping” Agency Science and Technical Materials After Daubert: Ensuring Relevance and
review, enhanced judicial scrutiny of agency science is necessary because “agency decisions too often either disregard scientific evidence or reflect public policy considerations merely masked as science.”\textsuperscript{108} The \textit{Daubert} principles, they argue, are consistent with the reasoned decisionmaking requirement, and would enhance the consistency of judicial review.\textsuperscript{109}

Critics of this approach have far outweighed supporters.\textsuperscript{110} \textit{Daubert}, of course, is inapplicable in a strict sense because it governs admissibility under the Federal Rules of Evidence.\textsuperscript{111} When courts review agencies, by contrast, that review is usually limited to a record already in existence. More fundamentally, if \textit{Daubert} operates as a check on a generalist judiciary, it seems odd to think that the generalist judiciary ought to wield it against the

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\textsuperscript{108} Raul & Dwyer, \textit{supra} note 84, at 9.
\textsuperscript{109} See Elliott et. al, \textit{supra} note 87, at 10,125 (comments of Alan Charles Raul).
\textsuperscript{111} Courts have uniformly concluded that \textit{Daubert} does not apply to judicial review of agency action, and have invoked various justifications. \textit{See}, e.g., Lobsters, Inc. v. Evans, 346 F. Supp. 2d 340, 344 (D. Mass. 2004) (“\textit{Daubert} and its progeny interpret the Federal Rules of Evidence, however, and the federal rules of evidence [sic] do not apply to NOA A hearings.”); \textit{Stewart v. Potts}, 996 F. Supp. 668, 678 n.8 (S.D. Tex. 1998) (“It does not apply to APA review of agency action. . . . The agency in this case is the factfinder, and the Court must give a high degree of deference to its expertise.”). Another explanation stems from separation-of-powers values. \textit{See}, e.g., \textit{Sierra Club v. Marita}, 46 F.3d 606, (7th Cir. 1995) (“While such a proposal might assure better documentation of an agency’s scientific determinations, we think that forcing an agency to make such a showing as a general rule is intrusive, undeferential, and not required.”). Agencies have likewise rejected requests to use \textit{Daubert} as part of their rulemakings. \textit{See} Claire R. Kelly, \textit{The Dangers of Daubert Creep in the Regulatory Realm}, 14 \textit{J. LAW \& POL’Y} 165, 187–89 (2006) (collecting examples).
This is particularly true considering the policy decisions embedded in agency science and the courts’ institutional role vis-à-vis agencies; Daubert fails to account for these important considerations that go beyond, for example, private tort litigation.\textsuperscript{113}

Even if courts have rejected invitations to expressly apply Daubert to agency science, a few have used the “spirit of Daubert” to inform their analyses. That is, they acknowledge Daubert is not directly applicable but use the Daubert standard of reliability to assess the weight of the scientific information that was before an agency when it made its decision. The “spirit of Daubert” cases seem largely confined to the Seventh Circuit and judicial reviews of agency adjudication,\textsuperscript{114} but there is some indication that the concept may be spreading.\textsuperscript{115} Moreover, at least one scholar has

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\item \textsuperscript{112} See McGarity, supra note 110, at 156 (“Judges’ limited competence in areas involving scientific data and analysis, complex modeling exercises, and large uncertainties is well recognized in administrative law and has been effectively demonstrated by the courts themselves in post-Daubert toxic torts opinions.”); Wagner, “Bad Science” Fiction, supra note 56, at 97 (“if the courts’ scientific competency is less than that of the party they are reviewing, it is unclear what the courts are contributing to the exercise”); Elliott et al., supra note 87, at 10,137 (comments of Richard Pierce) (“Federal judges don’t know much about science. They know a lot less about science than do agencies.”).
\item \textsuperscript{113} Elliott et al., supra note 87, at 10,137 (comments of Richard Pierce) (“Assigning a Daubert-like gatekeeper role to courts engaged in judicial review of agency risk assessments is a profoundly bad idea.”).
\item \textsuperscript{114} Pasha v. Gonzales, 433 F.3d 530, 535 (7th Cir. 2005) (concluding expert should not have been permitted to testify); Rodriguez Galicia v. Gonzales, 422 F.3d 529, 539 (7th Cir. 2005) (invoking “spirit” to reason that nothing in experts’ curricula vitae indicated that they were unqualified); Niam v. Ascroft, 354 F.3d 652, 660 (7th Cir. 2004) (“spirit of Daubert does apply to administrative proceedings . . . . ‘Junk science’ has no more place in administrative proceedings that in judicial ones.”); Peabody Coal Co. v. McCandless, 255 F.3d 465, 469 (7th Cir. 2001) (“The agency must act like an expert if it expects the judiciary to treat it like one.”).
\item \textsuperscript{115} See McElmurray v. U.S. Dep’t of Agric., 535 F. Supp. 2d 1318 (S.D. Ga. 2008) (“While Daubert does not apply to agency decisions in any formal respect, the principles underlying that decision do apply.”) (citing Pasha v. Gonzales, 433 F.3d at 535).
\end{itemize}
warned of a *Daubert* creep in which courts may be applying a sort of de facto *Daubert* analysis without making clear that they are doing so.\textsuperscript{116} This proposition is difficult to test, and the few cases cited for this proposition might be explained as examples of straightforward hard-look review.\textsuperscript{117} Even so, an implicit *Daubert-*ization would be subject to the same criticisms as an explicit approach, with the additional concern that judicial opinions would be less transparent.

There are many contrasts to be drawn between super deference and *Daubert-*ization. While *Daubert* requires judges to act as gatekeepers, assessing scientific evidence against the norms of science itself, super deference means that courts will defer to the agencies’ choices regarding the reliability of science. Unlike *Daubert*, super deference does not ask judges to dig deeply into agency science, recognizing that judges are the generalists and agencies the experts. And super deference is built on an understanding that agencies are the superior policymaking institution; it thus avoids the fear that *Daubert-*ization would impermissibly mire judges in policymaking because agency science is such a policy-laden enterprise. In these senses, then, the *Daubert-*ization debate makes super deference look like a good idea.

Yet this conclusion is not entirely satisfactory. *Daubert* is directed to reliability, not reasonableness, and as discussed above, super deference does not necessarily identify lack of reason. Further, super deference has its ossification and science charade shortcomings, and as demonstrated below, it is undermined in its own right by its context, reasoning, and application. Even so, the

\textsuperscript{116} See generally *Kelly*, supra note 111.

\textsuperscript{117} See Cellular Phone Task Force v. FCC, 205 F.3d 82, 90 (2d Cir. 2000) (citing *State Farm*); Miller & Rein, supra note 107, at 316–18 (citing Cellular Phone Task Force for proposition that courts are implicitly applying a *Daubert* review model); see also U.S. Steel v. Director, Office of Workers’ Compensation Programs, 187 F.3d 384, 388–89 (4th Cir. 1999) (finding in 5 U.S.C. § 556(d) support for the proposition that ALJs must perform “a gatekeeping function while assessing evidence to decide the merits of a claim”).
Daubert debate has always been helpful for placing the spotlight on judicial strengths and weaknesses vis-à-vis science. The problem, then, is fitting the generalist judiciary understanding arising from Daubert together with the very different context of judicial review of agency science. As we shall see, part of the key to this puzzle lies in the full discussion of super deference case law that follows.

III. SUPER DEFERENCE: A CRITICAL ASSESSMENT

As is already clear, agencies enjoy considerable deference from courts when they are acting within their expertise in gathering and analyzing factual material and engaging in related decisionmaking. The reasoning behind this approach draws on political theory as well as practical expediency. Not only are agencies accountable to the elected executive, but they have been created largely by Congress for the purpose of performing the work of experts. Both these characteristics serve a legitimizing function viewed as providing authority for agencies to make policy decisions. Courts, on the other hand, involve unelected, generalist judges. While the judicial check also serves to legitimize agencies, review under § 706(2)(A) or (D) provides for quite limited scrutiny.

Even though as a baseline matter agencies receive great deference, the super deference principle considers agencies’ scientific and technical endeavors as deserving of even more deference. This section begins by tracing the origins of super deference, a contextual story of revealing that it is in some ways an anomaly. Next, the section evaluates the flagship super-deference case, Baltimore Gas, in detail, revealing further the principle’s singularity. Taken with the concerns raised above, this analysis leaves little to commend super deference from a theoretical perspective. Turning to a practical perspective, this section next evaluates major super-deference opinions and finds little in the way of principled application.
A. Historical Antecedents and Deference to Agency Expertise

To understand the Baltimore Gas context, we start with the rise of modern administrative law from the New Deal and enactment of the APA.\textsuperscript{118} Coming on the heels of the \textit{Lochner} era,\textsuperscript{119} the post-New Deal period reflected an expertise model of administrative law.\textsuperscript{120} Under this view arose great faith in the “ability of experts to develop effective solutions to the economic disruptions created by a market system.”\textsuperscript{121} Indeed, economic regulations were the most common, such as those governing ratemaking by railroads and utilities.\textsuperscript{122} Judicial review was characterized by great deference on the basis of the agencies’ expertise.

\textsuperscript{118} For a detailed account of administrative law beginning in the 1800’s, see Rabin, \textit{Federal Regulation in Historical Perspective}, 38 \textit{Stan. L. Rev.} 1189 (1986); see also Bressman, \textit{supra} note 7, at 1758–67 (describing progression of eras in administrative law); Richard B. Stewart, \textit{The Reformation of American Administrative Law}, 88 \textit{Harv. L. Rev.} 1669 (1975) (providing descriptive and critical historical account).


\textsuperscript{120} Bressman, \textit{supra} note 7, at 1759; Stewart, \textit{supra} note 118, at 1678.

\textsuperscript{121} Rabin, \textit{supra} note 118, at 1266.

\textsuperscript{122} See, e.g., \textit{Hope Natural Gas, 320 U.S. 591}:

It is not the theory but the impact of the rate order which counts. If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry under the Act is at an end. The fact that the method employed to reach that result may contain infirmities is not then important. Moreover, the Commission’s order does not become suspect by reason of the fact that it is challenged. It is the product of expert judgment which carries a presumption of validity.

\textit{Id.} at 602.
The late 1960’s and 1970’s saw an unprecedented expansion in the scientific and technical uncertainties with which agencies were asked to grapple.\(^{123}\) Congress enacted a sweeping array of health, safety, and environmental statutes such as the Occupational Health and Safety Act,\(^ {124}\) the Consumer Product Safety Act,\(^ {125}\) The Clean Air Act,\(^ {126}\) the Clean Water Act,\(^ {127}\) and the National Environmental Policy Act.\(^ {128}\) Suddenly agencies were doing much more than making the economic predictions that had been their bread-and-butter since the New Deal; they were being asked to set standards under significant scientific uncertainties, where the stakes were potentially life-and-death.

Agencies were making procedural changes as well. While adjudication had been a staple of agency policymaking, agencies were now using informal rulemaking as the primary vehicle for setting policy.\(^ {129}\) As noted previously, the governing APA provision, § 553, provides far fewer requirements for informal rulemaking than the formal requirements set forth in §§ 556–57. Thus, informal procedures provided more efficient means for agencies to make law, and agencies took advantage of those procedures in the face of a dramatically increased workload.

Since the New Deal, judicial review had taken a laissez-faire approach to agencies, who after all were viewed as experts in administering what was largely economic regulation. But as

\(^{123}\) Rabin, *supra* note 118 at 1304.


Congress began mandating specific protective standards, it seemed that perhaps agencies needed to arrive at some “Right Answer.”\textsuperscript{130} And as agencies used less formal procedures for arriving at their answers, it seemed to many courts that there was not enough information available when it came to judicial review.\textsuperscript{131} Against this backdrop, the judiciary made an important shift critical to understanding super deference.

This shift moved the courts from deference to agency expertise to a period of substantive scrutiny and the imposition of additional procedure. In fact, two camps emerged, each advocating either substantive or procedural methods for achieving meaningful judicial review.\textsuperscript{132} The substantive approach, exemplified by Judge Leventhal’s opinion in \textit{International Harvester Co. v. Ruckelshaus},\textsuperscript{133} meant that agencies ought to be prepared to defend their methodologies “as reliable,” and courts ought to roll up their sleeves and delve deeply into the agencies’ scientific and technical determinations.\textsuperscript{134} The second camp, exemplified by Judge Bazelon’s concurrence in \textit{International Harvester}, worried that courts lacked the technical expertise to scrutinize agency science so carefully;\textsuperscript{135} instead, this camp espoused court-imposed

\textsuperscript{130} Rabin, \textit{supra} note 118, at 1311; \textit{see also} Int’l Harvester v. Ruckelshaus, 478 F.2d 615, 648 (D.C. Cir. 1973) (“It is in this perspective that we have not flinched from our discussion of the economic and ecological risks inherent in a ‘wrong decision’ by the Administrator.”).

\textsuperscript{131} See Rabin, \textit{supra} note 118, at 1309 (“[T]he courts were centrally concerned with the question of how to control effectively the exercise of administrative discretion in the singularly perplexing cases of scientific and technological complexity. Deference to traditional processes of informal rulemaking and adjudication in such cases appeared to be tantamount to surrendering the function of judicial review.”).

\textsuperscript{132} \textit{Id.} at 1307.

\textsuperscript{133} 478 F.2d 615 (D.C. Cir. 1973).

\textsuperscript{134} \textit{Id.} at 645.

\textsuperscript{135} \textit{Id.} at 651 (Bazelon, J., concurring) (“I recognize that I do not know enough about dynamometer extrapolations, deterioration factor adjustments, and the like to decide whether or not the government’s approach to these matters was statistically valid. Therein lies my disagreement with the majority.”).
procedures meant to ensure “a reasonable decision-making process.”\(^{136}\)

This latter approach—imposing procedures on agencies beyond those required by the APA—became known as “hybrid rulemaking.”\(^{137}\) And of critical importance, \textit{Baltimore Gas}’s pedigree includes the landmark case \textit{Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.}\(^{138}\) in which the Supreme Court rejected judicially imposed hybrid rulemaking procedures.\(^{139}\) \textit{Vermont Yankee} involved the Natural Resources Defense Council’s challenge to the Nuclear Regulatory Commission’s grant of a license (under the predecessor to the \textit{Baltimore Gas} zero-release assumption) to Vermont Yankee Nuclear Power Corporation to operate a nuclear power plant.\(^{140}\) The D.C. Circuit vacated and remanded because it perceived deficiencies in the agency’s rulemaking procedures.\(^{141}\) As the court explained, it could not perform its duty to review the administrative record because inadequate procedures led to underdeveloped factual issues regarding waste disposal.\(^{142}\)

The Supreme Court reversed, holding that courts may not impose procedures on agencies beyond those found in the APA. In so doing, the Court emphasized that agencies are better situated than courts to design procedures appropriate for their respective needs.

\(^{136}\) Id.
\(^{139}\) See Rabin, \textit{supra} note 118, at 1309 (calling \textit{Vermont Yankee} “the key case that questioned an expansive conception of judicial review” that had arisen in this era).
\(^{140}\) In a second decision also before the Supreme Court in \textit{Vermont Yankee}, the D.C. Circuit had remanded a decision of the NRC to grant a permit to construct another plant to Consumers Power Company. \textit{See Aeschliman v. NRC}, 547 F.2d 622 (1976).
\(^{142}\) Id. at 654.
regulated entities. More specifically, the Court invoked separation-of-powers concerns by rooting its analysis in the institutional structure whereby Congress had entrusted agencies with substantive functions. It specifically rejected NRDC’s argument that courts were free to require extra procedures, when, among other things, the agency’s proposed rule addressed complex or technical factual issues. Essentially, the Court was concerned that judicially-imposed procedures interfered with Congress’s design of the APA, which left considerable discretion to agencies as to the format for informal rulemaking. Further, the possibility of such hybrid procedures stood to undermine the values of uniformity and predictability.

The Court remanded for review of whether the original rule had support in the administrative record; ultimately, NRC adopted the zero-release rule which was then challenged in the D.C. Circuit, and this time, reviewed substantively, under the name *Baltimore Gas*.

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143 435 U.S. at 524–25 (citing FCC v. Schreiber, 381 U.S. 279, 290 (1965)).
144 Id. at 525. Indeed, the Court cited its opinion in *SEC v. Chenery*, 332 U.S. 194, 196 (1947), for the proposition that allowing court-imposed procedures would “propel the court into the domain which Congress has set aside exclusively for the administrative agency.”
145 435 U.S. at 545.
146 Id. at 548.
147 Id. at 546–47.
148 *See Baltimore Gas*, 462 U.S. at 92–95 (describing history). Note that *Vermont Yankee* and *Baltimore Gas* were part of a broader progression toward great deference that ushered in the presidential era of administrative law. Elena Kagan, *Presidential Administration*, 114 Harv. L. Rev. 2245, 2246–49 (2001). As exemplified by *Chevron v. Natural Resources Defense Council*, 467 U.S. 837 (1984), this model grounds administrative law in the President’s accountability and constitutional policymaking role. See Bressman, *Procedures as Politics*, supra note 7, at 1764 (describing presidential control model of administrative law as reflected by increasing judicial deference to agency decisions, the most prominent example being *Chevron*). Taken together, these cases represent a Court growing more willing to once again revert to deference to agencies on matters within their expertise.


B. **Baltimore Gas Scrutinized**

As noted above, *Baltimore Gas* involved another challenge to the NRC’s “zero-release assumption.” Recalling that the rule required licensing boards deciding whether to license nuclear power plants to make the generic assumption that permanent storage of certain nuclear waste would have no impact on the environment; that is, there would be a zero chance of release. Following the *Vermont Yankee* remand, the substantive reasonableness of that assumption was at the heart of the case.

The record reflected that NRC had acknowledged that the risks of a long-term repository failure were uncertain. However, it predicted that an appropriate site could be found that would maintain its integrity, and it also explained that the optimism of the zero-release assumption would be offset by other more precautionary assumptions that licensing boards were required to make. The Court of Appeals for the District of Columbia held that the zero-release assumption was arbitrary and capricious. Because the NRC had failed to factor the uncertainties surrounding the assumption into the licensing process in such a way that it could potentially be outcome-determinative in an individual licensing proceeding, the appellate court reasoned, the assumption failed NEPA’s requirement that an agency consider all significant environmental risks from its proposed action. Alternatively, the assumption required licensing boards to ignore factors relevant to NEPA, which was a clear error in judgment and therefore arbitrary and capricious.

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150 *Id.*
151 *Id.* at 92.
152 *Id.* at 94.
153 *Id.* at 94–95. The agency also rejected the option of having licensing boards reconsider these uncertainties in individual licensing proceedings, explaining that this was a generic question properly dealt with in rulemaking. *Id.* at 95–96.
154 *Id.* at 95–97.
155 462 U.S. at 95–96.
156 *Id.* at 96.
The Court rejected these rationales, citing three factors as critically important. First, the zero-release assumption was established for a very limited purpose, and other more comprehensive programs had been created for the broader purpose of evaluating long-term waste disposal technologies. Second, the assumption was a single figure in an entire table, and the overall table represented a precautionary, or over-conservative approach. Next, the Court explained:

[A] reviewing court must remember that the Commission is making predictions, within its special area of expertise, at the frontiers of science. When examining this kind of scientific determination, as opposed to simple findings of fact, a reviewing court must generally be at its most deferential.

Later, the Court emphasized that the zero-release assumption was a policy judgment:

We are acutely aware that the extent to which this Nation should rely on nuclear power as a source of energy is an important and sensitive issue. Much of the debate focuses on whether development of nuclear generation facilities should proceed in the face of uncertainties about their long-term effects on the environment. Resolution of these fundamental policy questions lies, however, with Congress and the agencies to which Congress has delegated authority, as well as with state legislatures and, ultimately, the populace as a whole. Congress has assigned the courts only the limited, albeit

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157 Id. at 101–02.
158 Id. at 102–03.
159 Id. at 103.
160 Id. at 105.
important, task of reviewing agency action to determine whether the agency conformed with controlling statutes. As we emphasized in our earlier encounter with these very proceedings, “[a]dministrative decisions should be set aside in this context, as in every other, only for substantial procedural or substantive reasons as mandated by statute ..., not simply because the court is unhappy with the result reached.”

Under the Overton Park standard, the agency had considered the relevant factors and “articulated a rational connection between the facts found and the choice made,” and so was not arbitrary and capricious. To assess the strength of the super-deference concept, three observations regarding the opinion itself are relevant. First, the super-deference principle was but one of three “factors” that the Court considered. Viewed as a mere factor, it was probably not outcome-determinative. Indeed, given the Court’s ultimate emphasis on its belief that the zero-release assumption was a policy decision, super deference was likely not necessary to the Court’s decision at all. This is because the agency’s decision was made in light of scientific uncertainty: thus, the zero release assumption was not really a scientific determination at all, but rather a metapolicy choice.

Yet the ultimate emphasis on policy raises questions about a second observation. In its statement of super deference, the Court distinguished between “scientific determination[s]” and “simple findings of fact.” But there was neither guidance as to how to delineate those two, nor any explanation of the mechanics of applying the Overton Park standard in different ways for each. Further, why should the distinction matter if the zero-release

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161 Id. at 97.
163 Id. at 101.
assumption was not a scientific determination at all, but rather a policy decision? Was this statement of super deference almost dictum?

This question haunts the opinion, particularly given the final observation about Baltimore Gas’s reasoning: as authority for super deference, the Court cited Industrial Union Department v. American Petroleum Institute (Benzene).164 It is a stunning use of authority, because the Benzene decision is known not for its extreme deference, but for the plurality’s poor treatment of science and particularly un-deferential approach.165 In Benzene, the Court struck down OSHA’s health standard limiting occupational exposure to benzene. Reduced to its essence, the Court’s opinion took issue with OSHA’s methodology: “the agency made no finding . . . that exposure to benzene at or below the 10 ppm level had ever in fact caused leukemia.”166 The Court seemed to review the scientific evidence before OSHA anew, criticizing OSHA’s decisions regarding the strength of various studies and its assumptions regarding risk.

Indeed, Justice Marshall’s dissent in Benzene highlighted the problem: “The critical problem in cases like the ones at bar is scientific uncertainty.”167 He emphasized that “judicial review under the substantial evidence test is ultimately deferential,”168 and took the majority to task for substituting its judgment for that of

164 448 U.S. 607 (1980) (plurality opinion).
165 There are numerous criticisms of the case. See, e.g., Wagner, “Bad Science” Fiction, supra note 56, at 116 n. 235 (2003) (collecting opinions that have cited the Benzene case in raising the burden of proof beyond what may be called for in statutory mandates); Elliott et al., supra note 87, at 10,137 (comments of Richard J. Pierce, Jr.) (“Anyone who has had Toxicology 101, even if they got a D in it, can see that the risk that the [Benzene] court calls trivial is much larger than the risk the court calls plainly unacceptable. I don’t want fools like that messing around with science, and that’s the best of our judiciary.”).
166 448 U.S. at 634.
167 Id. at 689 (Marshall, J., dissenting); see also id. at 662 (Burger, J., concurring) (“These cases press upon the Court difficult unanswered questions on the frontiers of science and medicine.”).
168 Id. at 705 (Marshall, J., dissenting).
the agency. Although he acknowledged that judicial review is difficult where there is a high level of technical complexity, he emphasized that factual issues may not be subject to any definitive resolution. And, “when the question involves determination of the acceptable level of risk, the ultimate decision must necessarily be based on considerations of policy as well as empirically verifiable facts.”

Not only does the Benzene plurality fail generally to support any sort of super deference, but the specific portion of the Benzene plurality opinion to which Baltimore Gas cites fails to support the sweeping regular facts/scientific determination distinction. The Benzene plurality stated that OSHA’s statutory mandate, which allowed the Secretary to regulate on the basis of the “best available evidence,” gave OSHA “some leeway where its findings must be made on the frontiers of scientific knowledge.” Neither of the cases cited by the Benzene plurality for authority is particularly valuable for understanding the super-deference principle. One, Industrial Union v. Hodgson, merely states the core of Overton Park in another way: “when the Secretary is obliged to make policy judgments where no factual certainties exist or where facts alone do not provide the answer, he should so state and go on to identify the considerations he found persuasive.” The other, Society of Plastics Industry v. OSHA, simply cited Hodgson for the proposition that the Secretary permissibly established a conservative exposure threshold in light of scientific uncertainty.

The dubious necessity of, and support for, the super deference principle as stated in Baltimore Gas, coupled with its historical

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169 Id. at 705–06.
170 Id. at 706; cf. id. at 693 (“the requirement that the Secretary act on the basis of ‘the best available evidence’ was intended to ensure that the standard-setting process would not be destroyed by the uncertainty of scientific views.”).
171 Id. at 656.
172 499 F.2d 467, 475 (D.C. Cir. 1974); see id. at 474 (“[S]ome of the questions involved in the promulgation of these standards are on the frontiers of scientific knowledge . . . . Decision making must in that circumstance depend to a greater extent upon policy judgments and less upon purely factual analysis.”).
173 509 F.2d 1301, 1308 (2d Cir. 1975).
background and *Vermont Yankee* pedigree, suggest conflicting lessons. On one hand, *Baltimore Gas*’s strong language could be viewed as a signal that the Supreme Court was retreating from its tolerance of extreme substantive scrutiny exemplified by the Leventhal approach, and evidenced by the Court itself in cases like *Benzene*.¹⁷⁴ On the other hand, it could simply have been a strongly-worded rebuke to the D.C. Circuit to stop getting in the way of the NRC.¹⁷⁵ Neither possibility is particularly satisfying, and neither explains the mysterious distinction made in *Baltimore Gas* between “scientific determinations, as opposed to simple findings of fact.”¹⁷⁶

*Baltimore Gas* received little scholarly attention. Some commentators, critical of super deference, attempted to confine that principle to the nuclear policy debate: “[The case] sets no standard of agency behavior, but instead disrupts the institutional balance by reaffirming the Court’s past practice of blocking judicial oversight of nuclear power regulation.”¹⁷⁷ Yet the commentary also raised a more generalized concern familiar to

¹⁷⁴ See also Richard A. Cordray & James T. Vradelis, *The Emerging Jurisprudence of Justice O’Connor*, 52 U. Chi. L. Rev. 389, 409 n.81 (1985) (commenting Justice O’Connor’s restraint in *Baltimore Gas* was consistent with her opposition to the judiciary’s undertaking scientific judgment in abortion cases).

¹⁷⁵ Seigel, *supra* note 12, at 362 (arguing years immediately following *Baltimore Gas* saw a trend illustrating “the courts’ general unwillingness to exercise a significant role in overseeing the operation of the nuclear power industry.”); Yellin, *supra* note 12, at 1320 n. 128 (calling *Baltimore Gas* cases “shadow versions of the debate about the legitimacy and long-term viability of the commercial nuclear-power industry in which the courts have no institutional role”).


¹⁷⁷ Yellin, *supra* note 12, at 1322; see also Paul Weinstein, *Note, Substantive Review Under NEPA After Vermont Yankee IV*, 36 Syracuse L. Rev. 837, 879 (1985) (confining super-deference language to case’s facts and noting that “it entailed a decision by the NRC on whether that agency would continue to carry on a major function long committed to it—the decision of whether to continue to license nuclear reactors.”).
current observers of the science charade: that a highly deferential approach to scientific and technical determinations incentivizes agencies to cloak their true reasoning behind an unassailable mantle of science.\textsuperscript{178} Even so, the initial scholarly responses to \textit{Baltimore Gas}—appearing from 1983 though 1987—had no or sparse case law from which to assess how \textit{Baltimore Gas} would impact judicial review of agency science.\textsuperscript{179} With the benefit of nearly thirty years of super deference, we can now take up that task.

\textbf{C. Progeny and Modern Applications}

A cursory look at super deference in the case law suggests it has experienced longevity because it continues to be cited frequently by courts confronting agency science. The number of citations, however, is misleading. The Supreme Court has used the principle only one time, and—although initially the courts seemed to take super deference to an extreme—it seems to have become meaningless boilerplate that simply obscures what courts are really

\textsuperscript{178} Siegel, \textit{supra} note 12, at 346 n. 82 (arguing \textit{Baltimore Gas}'s reference to “sheer volume” of proceedings improperly suggested an agency can comply with statutory requirements merely by amassing paper); \textit{id.} at 377 (“One possible result of the deference rule is that agencies will strain to characterize their policy decisions, especially if they are controversial, as resting on technical or scientific judgments.”); Yellin, \textit{supra} note 12, at 1317-18 (“It remains to be seen whether as agencies grow more sophisticated in facing reviewing courts, they defeat the adaptive process, increasing their discretionary powers by drawing more of the real substance of decisions into a realm that plausibly can be described as the scientific and technological frontier.”); see also Donald W. Stever, Jr., \textit{Deference to Administrative Agencies in Federal Environmental Health and Safety Litigation: Thoughts on Varying Judicial Application of the Rule}, 6 W. NEW ENG. L. REV. 35, 68–69 (1983) (articulating two concerns about super deference: a “potential for the development of a tyranny by bureaucrat-technicians in the absence of strong-minded judicial review;” and nontechnical bases for decisions may be “obscured by agency lawyers who cloak the regulation in scientific or technical buzzwords.”).

doing: hard look review. Even so, tracing the path of super
deferece is rewarding, because it suggests a better normative
account of the courts’ role with respect to agency science.

1. The Supreme Court

Since Baltimore Gas, the Supreme Court has cited the super-
deferece principle only once again, in another NEPA case: Marsh v. Oregon Natural Resources Council.\(^{180}\) There, the Court upheld the district court’s judgment in favor of the Army Corps of Engineers, where the Corps determined that a supplemental Environmental Impact Statement (EIS) was not necessary to address information that developed after the preparation of the original EIS. At issue was the construction of a dam and environmental organizations’ claims that the dam would cause increased turbidity in water downstream that would impair fishing.\(^{181}\) The Corps’ EIS concluded that the proposed dam might occasionally impair fishing, but ultimately the Corps decided to proceed with the construction.\(^{182}\) The environmental organizations argued that two new sources of data justified a supplemental EIS: a memo suggesting that the dam would adversely impact downstream fishing based on a draft study by the Oregon Fish and Wildlife Department; and a Soil Conservation Service soil survey that could be interpreted to predict greater downstream turbidity than the EIS contemplated.\(^{183}\)

Before turning to the merits, the Court resolved a dispute about the appropriate standard of review. It rejected the organizations’ contention that the issue was primarily a question of law deserving no deference. Instead, the Court determined that the arbitrary and capricious standard of § 706(2)(A) applied. As the Court

\(^{180}\) 490 U.S. 360 (1989).
\(^{181}\) Id. at 378–79. Turbidity is a measure of the light that is reflected by material in water; it is an indirect measure of the amount of suspended matter in the water. See id. at 364 n.2.
\(^{182}\) Id. at 367–68.
\(^{183}\) Id. at 370.
remarked, this was “a classic example of a factual dispute the resolution of which implicates substantial agency expertise.”184 The Court cited *Baltimore Gas* for the proposition that because analysis of the new information requires a high level of expertise, the Court should defer to the informed discretion of the agency, including in a parenthetical an excerpt from the super-deference principle standing for the requirement that a Court be at its “most deferential.”185

This is an intriguing use of super-deference because, rather than applying it as an exercise in deference, the Court used it as authority for which deference ought to be applied in choosing from the options set forth in § 706 of the APA. Indeed, when the Court later turned to the merits, it cited *Overton Park* for the scope of arbitrariness review, and stated, “[w]hen specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive.”186 Still, the Court stated that it was nevertheless important to fulfill the role of judicial review by carefully reviewing the record to ensure the agency had made a reasoned decision.187 The Court did not mention super deference again, and proceeded to apply an ordinary hard-look-style reasonableness review. As to the memo, the Corps had determined that its conclusions were based on a study with faulty methodology; and as to the soil survey, the Corps had undertaken a more detailed study of turbidity issues and considered more information than a simple soil survey map.188 The Court therefore concluded that the Corps had conducted a reasoned evaluation of the relevant information.

184 *Id.* at 376.
185 *Id.* at 377 (citing *Baltimore Gas & Electric Co. v. Natural Res. Def. Council*, 462 U.S. 87, 103 (1983)).
186 *Id.* at 378 (citing *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402 (1971)).
187 *Id.*
188 *Id.* at 382–85.
“and reached a decision that, although perhaps disputable, was not arbitrary and capricious.”

Marsh illustrates that a special super deference principle is not needed, and it hints at reasons why. First, the Court was obviously aware of the Baltimore Gas standard since it cited that case for a different proposition, but its omission of that standard in substantive review suggests that the standard is superfluous. Second, the Court’s use of Overton Park provides a justifiable basis for the omission. As the Court applied Overton Park, agencies were the specialists entitled to rely on their expertise to engage in reasoned decision making. While this standard was deferential—it accounted for the Corps’ scientific and technical knowledge and did not dig deeply into its methodology—the Court nevertheless required the Corps to explain itself reasonably.

Adding to these conclusions, Marsh was the last time the Court expressly referenced the super-deference principle. To be sure, the Court has considered numerous agencies’ scientific determinations under the arbitrariness standard. Yet in none of those does the super-deference principle appear. This stands in marked contrast to the Court’s ongoing special willingness to defer to legislatures in matters of science, even when the legislature got some of the science wrong.

Lower court opinions do continue to cite Baltimore Gas and the general super-deference principle. Viewed as a whole, they appear to demonstrate a chronological trend moving from more, to less, deference. At the same time, they fail to demonstrate any

189 Id. at 385.
191 See generally Meazell supra note 6 (exploring this approach of “scientific avoidance” with respect to legislative science).
norms of principled application or, for that matter, any guiding consensus at all.

2. Initial Lower-Court Responses

As noted previously, *Baltimore Gas*’s nuclear-policy context is an important dimension to the case. Although left tacit in *Baltimore Gas* itself, the courts have long viewed Congress’s intent as having provided for the courts “a very limited role . . . in the statutory scheme regulating the construction and operation of commercial nuclear power plants.”192 This heritage made the super-deference principle easy to assimilate in nuclear power cases. *Carstens v. NRC*193 provides a typical example. There, the D.C. Circuit considered a challenge to NRC’s decision to grant an operating license to a nuclear power plant in an area of seismic activity in California. In considering whether to grant the license, the licensing board conducted hearings that collected extensive evidence on the seismic activity issue.194 As the court noted, the petitioners did not argue that the NRC had failed to follow the required procedures in addressing the seismic issue; rather, “they

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192 Ohio v. NRC, 814 F.2d 258, 264 (6th Cir. 1987); see also Massachusetts v. NRC, 924 F.2d 311, 324 (D.C. Cir. 1991) (“the Commission’s licensing decisions are generally entitled to the highest judicial deference because of the unusually broad authority that Congress delegated to the agency under the Atomic Energy Act.”); Ohio v. NRC, 868 F.2d 810, 812 (6th Cir. 1989) (“Congress has recognized the highly technical nature of such regulations and has accordingly circumscribed the power of the courts both to review and to overturn decisions made by the NRC.”) (citing *Baltimore Gas*’s super deference principle); Siegel v. Atomic Energy Commission, 400 F.2d 778, 783 (D.C. Cir. 1968) (noting the Atomic Energy Act of 1954 creates “a regulatory scheme which is virtually unique in the degree to which broad responsibility is reposed in the administrative agency, free of close prescription in its charter as to how it shall proceed in achieving the statutory objectives.”); cf. Citizens Awareness Network, Inc. v. U.S. NRC, 59 F.3d 284 (1st Cir. 1995) (holding arbitrary and capricious NRC’s unexplained change in decommissioning policy, which was contrary to agency’s own regulations).

193 742 F.2d 1546 (D.C. Cir. 1984).

194 742 F.2d at 1548–49.
take issue with the substantive outcomes of those investigations. . . . Unfortunately for them, it is in these substantive areas that this court’s deference to the agency justifiably reaches its zenith.”

The court emphasized that the regulatory scheme at issue was “virtually unique” in the broad discretion assigned to the NRC under the Atomic Energy Act. Quoting Baltimore Gas, the court added that “the Supreme Court has made it crystal clear that our review of NRC licensing decisions is ‘limited.’” And “[t]he voluminous record persuasively evidences the care with which the NRC discharged its statutory duties. Without hesitation, we find that this decision is supported by substantial evidence, and that its actions were not arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” Although the court’s rhetoric was strong, it nevertheless addressed the petitioners’ specific contentions and described the agency’s response.

The court’s discussion reveals that the petitioners’ substantive arguments were directed at proto- and mesopolicy decisions. For example, the parties disagreed over the mesopolitical issue of how to interpret a U.S. Geological Survey (USGS) model of one of the fault zones. The licensing board’s interpretation, however, was supported by record evidence: a USGS witness testified at the hearing and explained its own interpretation, which the agency found persuasive. Indeed, the court perhaps unnecessarily stated, “[p]etitioners’ reading of the description set forth in the USGS model . . . is entirely understandable, particularly in light of the fact that petitioners are not and do not purport to be trained seismologists.” As another example, the petitioners contended that the agency’s determination that the reactors’ design (which
was based on an earthquake of a magnitude of seven on the Richter scale) was adequate to protect public safety, was unsupported by substantial evidence.\textsuperscript{202} One witness had used a mean value to arrive at the designed-for earthquake magnitude; the petitioners made the protopolitical argument that he should have used the mean value plus one standard deviation.\textsuperscript{203} Yet the court determined that the NRC’s reliance on that witness was reasonable; the agency had explained the conservative assumptions inherent in his model, and his findings were corroborated by other testimony.\textsuperscript{204}

In sum, the petitioners’ arguments seemed directed at policy: they argued that the scientific uncertainty associated with earthquakes, coupled with the statutory requirement that reactor design be based on conservative assumptions, dictated that the court impose a different outcome.\textsuperscript{205} Yet as the court explained, “petitioners fundamentally misperceive the judiciary’s role in complex regulatory matters. The uncertainty of the science of earthquake prediction only serves to emphasize the limitations of judicial review and the need for greater deference to policymaking entities.”\textsuperscript{206}

Because \textit{Carstens} addressed each of the petitioners’ contentions and described why the NRC had nevertheless acted reasonably, it cannot be said that the court mechanically applied super deference without exercising any oversight.\textsuperscript{207} This is particularly true when one considers the proto- and mesopolitical nature of the petitioners’ substantive arguments, and the fact that reasonable experts, exercising professional judgment, could disagree on those matters. Even so, the court’s strong language

\textsuperscript{202} \textit{Id.} at 1556.
\textsuperscript{203} \textit{Id.}
\textsuperscript{204} \textit{Id.}
\textsuperscript{205} \textit{See id.} at 1557.
\textsuperscript{206} \textit{Id.}
\textsuperscript{207} \textit{But see} Siegel, \textit{supra} note 12, at 366 (arguing \textit{Carstens} demonstrates judicial willingness to mechanically apply super deference, particularly in nuclear power decisions).
seemed to pit the might of science against the petitioners’ relative lack of expertise. Coupled with the court’s emphasis on the voluminous record, one can easily surmise that this early post-
*Baltimore Gas* exemplar reinforced agency incentives to amass favorable science, stacking the deck for favorable future litigation and contributing to ossification and the science charade.  

Although there may have been reasons to confine *Baltimore Gas* to its unique nuclear-power context, the opinion itself is worded broadly, and courts were quick to incorporate the super-deference principle in other contexts. The D.C. Circuit opinion in *Motor Vehicle Manufacturers Ass’n v. Ruckelshaus* provides an example.  

Ruckelshaus involved a challenge to vehicle emissions testing requirements established by the EPA pursuant to

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208 Numerous other nuclear power opinions, many coming closely on the heels of *Baltimore Gas*, are similar to *Carstens* in their approaches and outcomes. *E.g.*, Citizens for Fair Utility Regulation v. NRC, 898 F.2d 51, 54 (5th Cir. 1990) (citing *Baltimore Gas* for general proposition of deference, and upholding NRC’s denial of petition to intervene in nuclear power plant licensing proceeding); Envt’l Defense Fund v. NRC, 902 F.2d 785, 788 (10th Cir. 1990) (citing *Baltimore Gas* super-deference principle in *Chevron* context with respect to regulation of uranium and thorium mill tailings); State of Ohio v. NRC, 868 F.2d 810, 818-19 (1989) (upholding denial of hearing to revoke power plant’s operating license because of challenges to emergency preparedness plan; NRC did not act arbitrarily where it found that adequate measures were in place should an emergency arise); Ohio v. NRC, 814 F.2d 258 (6th Cir. 1987) (rejecting challenge to NRC’s denial of motion to intervene and reopen proceedings; would-be intervenors challenged sufficiency of nuclear power plant design in light of earthquake that occurred in plant vicinity, however, possibility of earthquake had been considered in plant design and NRC did not act arbitrarily in refusing to reopen proceedings); Lorion v. NRC, 785 F.2d 1038, 1043 (D.C. Cir. 1986) (declining invitation to reverse NRC’s substantive decision regarding susceptibility of reactor vessels to pressurized thermal shock and explaining that that issue falls squarely within *Baltimore Gas*); In re Three Mile Island Alert, Inc., 771 F.2d 720 (3d Cir. 1985) (upholding decision to reopen nuclear power plant following accident); *see also* Massachusetts v. NRC, 924 F.2d 311, 324 (D.C. Cir. 1991) (acknowledging distinctions, but illustrating little practical difference, between *Baltimore Gas* super-deference, that accorded agencies’ interpretations of their own regulations, and “the heightened deference for NRC licensing decisions that flows from its broad statutory mandate”).  

209 719 F.2d 1159 (D.C. Cir. 1983).
the Clean Air Act. In setting such standards, Congress mandated that the EPA ensure that its “short-test” requirements—protocols for testing emissions of in-use vehicles—would correlate reasonably with tests used on preproduction vehicles.\textsuperscript{210} The petitioners argued that the agency failed to comply with its mandate that it use “good engineering practices” because short-test results could not be correlated with preproduction tests due to differences between temperature, humidity, and atmospheric pressure—a protopolicy argument.\textsuperscript{211} The EPA explained, however, that the level of standards it adopted, which utilized greatly simplified “cutpoints” designed to result in false positives no more frequently than in preproduction tests—made such variations insignificant.\textsuperscript{212}

The court reasoned that “the use of cutpoints to fudge complex technological problems” was permissible so long as it was consistent with the statutory scheme. “In this respect,” the court explained, “we are mindful of the Supreme Court’s recent admonition” in *Baltimore Gas* that requires reviewing courts be at their most deferential when agencies act within their expertise on the frontiers of science.\textsuperscript{213} Arguably, this factual scenario was similar to *Baltimore Gas*: faced with the inability of science and technology to fine-tune the agency’s analysis, the agency made certain working assumptions that it acknowledged were imperfect. According to the court, those assumptions were accorded deference because they reflected reasoned judgment and incorporated policy choices—here, in accommodating the conflicting interests of vehicle manufacturers and the public.\textsuperscript{214}

Yet *Ruckelshaus* is notable for the cursory look it gave to the agency’s response to the ambient-conditions issue. Unlike *Baltimore Gas*, which explained the data relied on by the

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\textsuperscript{210} 719 F.2d at 1161–62.
\textsuperscript{211} Id. at 1167.
\textsuperscript{212} Id. at 1167.
\textsuperscript{213} Id. at 1167.
\textsuperscript{214} See id. at 1167 (describing agency’s use of cutpoints as “reasonable accommodation of conflicting interests”).
petitioners as well as how the agency addressed those considerations, the Ruckelshaus opinion is silent as to the potential impact of the petitioners’ ambient conditions consideration, and it does not describe why the agency’s approach amounted to “good engineering practice.” In fact, the opinion cites only the agency’s ipse dixit to support its determination that the agency acted reasonably. In these respects, Ruckelshaus seemed to go further than Baltimore Gas itself because not only did it give deference to the agency’s technical determinations, but it did not even explain what those determinations were or why they were consistent with the agency’s statutory mandate. This approach seems unlikely to uncover administrative science errors, and it does little to reinforce transparency, deliberation, or accountability.

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215 Id.

216 Numerous other opinions, involving little analysis, were issued shortly after Baltimore Gas. See, e.g., Natural Res. Def. Council v. EPA, 868 F.2d 1420, 1430 (9th Cir. 1988) (upholding EPA’s choice of test for determining toxic effluent limitations: “Here we deal not with issues not of fact or law but of scientific measurement. In assessing difficult issues of scientific method and laboratory procedure, we must defer to a great extent to the expertise of the EPA.” (citing Baltimore Gas)); Am. Petroleum Inst. v. EPA, 858 F.2d 261, 264 n.3 (5th Cir. 1988) (citing Baltimore Gas amongst list of deferential citations in support of upholding, following remand, EPA’s best available technology determination pursuant to CWA); New York v. EPA, 852 F.2d 574, 580 – 81 (D.C. Cir. 1988) (citing super-deference to support upholding agency’s interpretations of scientific evidence underpinning denial of state petitions to reevaluate CAA implementation plants); Nat’l Wildlife Fed’n v. Hodel, 839 F.2d 694, 761 & n.107 (D.C. Cir. 1988) (citing Baltimore Gas and upholding agency regulation related to top soil storage pursuant to Surface Mining Control and Reclamation Act, where agency made reasoned decision relevant to a “highly technical issue”); Michigan v. Thomas, 805 F.2d 176, 182 (6th Cir. 1986) (citing super-deference principle and upholding EPA’s disapproval of state’s proposed rules to control fugitive dust emissions); Hawaiian Electric Co. v. EPA, 723 F.2d 1440, 1446 (9th Cir. 1984) (citing super-deference principle to support upholding agency’s reliance on its modeling techniques for Clean Air Act permitting). But see Found. on Econ. Trends v. Heckler, 756 F.2d 143 (D.C. Cir. 1985) (relying not on super deference but on Baltimore Gas’s more general language describing the role of NEPA in ensuring that an agency has taken a “hard look” at environmental consequences to uphold injunction on experiment using release of genetically altered bacteria).
3. Transitions

While the super-deference principle continued to be cited in the coming years, the extreme deference of the early post-\textit{Baltimore Gas} period seemed to give way to a more measured approach. An illustrative case is \textit{American Legion v. Derwinski}, in which the D.C. Circuit relied on the principle to uphold the Secretary of Veterans Affairs’s (VA’s) decision to abandon its study of the long-term health effects of exposure to Agent Orange.\footnote{54 F.3d 789 (D.C. Cir. 1995).} The unusual statutory scheme at issue involved a congressionally-mandated study to investigate such effects in Vietnam veterans.\footnote{Id. at 807.} Numerous agencies were involved, including the Centers for Disease Control (CDC), the Office of Technology Assessment (OTA), and a presidential oversight panel. The court began by meticulously describing various failed attempts at designing a study, after which the VA issued a letter to Congress that stated,

\begin{quote}
[N]o one has successfully identified a large enough group of Vietnam veterans known to have been exposed to Agent Orange or other herbicides to allow the preparation of a protocol and the conduct of an epidemiological study as required by [the statute]. I must, therefore, advise you that no scientifically sound study can be undertaken and request that the VA be relieved of the requirement to do this research.\footnote{Id. at 808.}
\end{quote}

In its recitation of standards applicable to the challenge of this determination, the court began with typical \textit{State Farm} and \textit{Overton Park} language, emphasizing that it would examine
challenges to the agency’s scientific conclusions, but would afford those conclusions super deference.\textsuperscript{220}

The plaintiffs first challenged the merit of the CDC’s methodology in concluding that exposure estimates based on military records were not scientifically valid.\textsuperscript{221} The court summarily rejected this protopolicy challenge with little discussion: “At the heart of plaintiffs’ argument, however, is a challenge to the scientific merit of the CDC’s research rather than the rationality of its conclusion. . . the Court finds that the CDC’s methodology and research exhibit reasoned decisionmaking . . . .”\textsuperscript{222} The plaintiffs also challenged the VA’s decision to cancel the Agent Orange study. The court likewise rejected this argument, listing the various sources of evidence upon which the VA had relied, and stating simply its finding that the VA’s conclusion that no scientifically valid study could be performed was reasoned.\textsuperscript{223}

American Legion represents a transitional super-deference approach for two reasons. First, it is notable that the court included the super deference citation in the same recitation of standards that including the hard-look \textit{State Farm} citation. This usage hints that super deference was becoming boilerplate—a suggestion confirmed by later cases.\textsuperscript{224} Second, although lacking in detailed analysis, the opinion presented a sufficiently full discussion of the facts to provide support for its later conclusion that the agency engaged in reasoned decisionmaking. As discussed below, later cases reveal an increasingly \textit{less} super-deferential approach, wherein courts carefully discuss the scientific issues raised. American Legion therefore exemplifies an intermediate step between cases like Ruckelshaus and what was to come.\textsuperscript{225}

\textsuperscript{220} \textit{Id.} at 812–13.
\textsuperscript{221} \textit{Id.} at 813.
\textsuperscript{222} \textit{Id.}
\textsuperscript{223} \textit{Id.}
\textsuperscript{224} See infra \textit{PART} III.C.4. (providing examples of this development).
\textsuperscript{225} For opinions illustrating similar approaches, see, e.g., \textit{Associated Fisheries of Me., Inc. v. Daley}, 127 F.3d 104, 110 (1\textsuperscript{st} Cir. 1997) (brief analysis following description of facts; upholding agency action under Magnuson Act); \textit{Henley v. FDA}, 77 F.3d 616, 620–21 (2d Cir. 1996) (citing \textit{Baltimore Gas} along with
4. Modern applications: Super Deference as Boilerplate and the Return to Hard Look

Recent applications of super deference confirm these observations. First, the principle has become meaningless boilerplate. It is typically cited by courts along with the hard look standards set forth in *State Farm*, and it is rarely used separately to illuminate courts’ analyses. Second, the courts have moved away from the extreme deference exhibited by cases like *Carstens* and *Ruckelshaus*, returning to a hard-look approach that systematically describes and evaluates each major scientific contention.

Consider the recent example of *American Coke & Coal Chemicals Institute v. EPA*, where the D.C. Circuit upheld an EPA rule that revised nationwide limitations on certain water pollutant discharges associated with cokemaking. The challenge focused primarily on assumptions the EPA made in setting industry effluent limitations. For example, to compensate for data gaps relevant to the ability of publicly-owned treatment works (POTWs) to remove cokemaking pollutants, the EPA made two estimates. First, where POTWs provided data on the minimum

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*State Farm*, but providing more discussion of evidence supporting petitioner’s and FDA’s positions with respect to labeling of oral contraceptives); cf. *Harris v. United States*, 19 F.3d 1090, 1096 n.8 (5th Cir. 1994) (describing scientific evidence for both sides but upholding FWS delineation of wetlands: “As this appears to be the typical battle of the experts, we defer to the agency’s interpretation.”).

An occasional early case took this approach. See generally New Mexico v. U.S. Dep’t of Housing and Urban Development, No. 84-2347, 1987 WL 109007 (10th Cir. Jan. 7, 1987) (unpublished opinion) (upholding safety standards for formaldehyde levels in manufactured housing); id. at *2-3 (citing both *State Farm* and *Baltimore Gas* super deference).

These observations belie one *Baltimore Gas* observer’s early prediction that *State Farm* ought to be viewed as a specialized exception to *Baltimore Gas*: “In review of administrative environmental determinations, the *Baltimore Gas* standard clearly dominates.” *Siegel*, supra note 12, at 375.

452 F.3d 930 (D.C. Cir. 2006).
detected levels of the pollutants in effluent, the EPA assumed that influent contained ten times those minimum levels. Second, where the pollutants were below detectable levels, the EPA assumed that influent contained the minimum detectable levels. In its explanation of these selections, the EPA acknowledged that these choices might lead to both over- and under-estimations of the actual influent levels.

Citing both *State Farm* and the super deference principle, the court rejected the protopolitical challenges to this methodology. As the court explained, “EPA was confronted with a situation in which it was not possible, given the current state of technology, to establish conclusively the relative effectiveness” of types of treatment. The petitioner had cited nothing suggesting EPA’s assumptions were unreasonable; thus, the court upheld EPA’s approach, emphasizing that “[s]uch decisions involve expert statistical and scientific judgments to which this court properly defers.”

Still, even though the court could have easily rejected the petitioner’s challenge for failing to provide competing evidence, the court took each contention in turn, explaining the issues and evidence supporting the reasonableness of the agency’s determination.

Likewise, in *Catawba County v. EPA*, the D.C. Circuit considered challenges to the EPA’s designations for the national ambient air quality standards (“NAAQS”) applicable to fine particulate matter pursuant to the Clean Air Act. After rejecting challenges that EPA improperly failed to use notice-and-comment rulemaking procedures and failed to properly interpret its statutory

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229 *Id.* at 935.
230 *Id.*
231 *Id.* & n.10.
232 See *id.* at 941–42 (“The court owes particular deference to EPA when its rulemakings rest upon matters of scientific and statistical judgment within the agency’s sphere of special competence and statutory jurisdiction.”).
233 *Id.* at 942–43.
234 *Id.* at 943.
235 *Id.* at 943–48.
236 571 F.3d 20 (D.C. Cir. 2009).
mandate pursuant to *Chevron*, the Circuit turned to the argument that the Designations Rule was arbitrary and capricious because it was “riddled with methodological flaws and inconsistencies.”\(^{237}\) The court cited the general standard for arbitrary and capriciousness, and stated, “[o]f particular note in this challenge, we give an extreme degree of deference to EPA when it is evaluating scientific data within its expertise.”\(^{238}\)

Thereafter, the court turned to each of the challengers’ many arguments. For example, the challengers contended that the EPA had relied upon a mistaken estimate of carbon emission by power plants that burn bituminous coal.\(^{239}\) It turned out that the EPA was wrong about those estimates, and it revised its carbon emission profile for those plants in 2006.\(^{240}\) But the 2004 designations were based on the old estimates; thus, the industry petitioners argued that the nonattainment designations for power plants burning bituminous coal were flawed. EPA responded, however, that its ultimate designations did not turn on “any one estimate of a single chemical component” of particulate matter.”\(^{241}\) Rather, it relied on numerous data points that were “largely unaffected” by the carbon estimate. Further, the EPA explained that as the carbon estimate decreased, the crustal estimate actually increased, so the overall determination was not substantially impacted.\(^{242}\)

At this juncture, the court reasoned that EPA was not required to upend its entire process when it discovered its mistake; all that was required was for the agency to use the best information available when making its decisions, and to deal with newly

\(^{237}\) *Id.* 40. Note that the court applies the same standard of review under the Clean Air Act as under the APA for arbitrary and capriciousness. *Id.* at 41.

\(^{238}\) *Id.* at 41 (internal quotations and citation omitted).

\(^{239}\) *Id.* at 44. The term “bituminous” refers to a classification reflecting the amount of carbon in coal. Bituminous coal is the most abundant type of coal in the United States. See Energy Information Administration, *Coal Explained* (Jan. 26, 2010), http://tonto.eia.doe.gov/energyexplained/index.cfm?page=coal_home.

\(^{240}\) 571 F.3d at 45.

\(^{241}\) *Id.*

\(^{242}\) *Id.*
acquired evidence “in some reasonable fashion.”\textsuperscript{243} Here, the court explained, EPA dealt reasonably with the new evidence because it explained why it would not have changed the designations. In fact, EPA even granted a March 2006 request to recalculate the weighted emissions scores using the revised emissions estimates and concluded that doing so would not change the outcome.\textsuperscript{244}

Notably, the court did not mention the super-deference principle in any of its analysis of the arbitrary and capriciousness of the agency’s actions. Once in its analysis it mentioned \textit{State Farm}\textsuperscript{245} for upholding a decision of “less than ideal clarity if the agency’s path may reasonably be discerned,”\textsuperscript{246} and it later referenced the same case for the concept of deferential review, where an agency must articulate a “rational connection between the facts found and the choice made.”\textsuperscript{247} The closest the court came, in its actual analysis, to super-deference language was in its unremarkable discussion of the remedy: the court stated, “[i]n light of the agency’s scientific expertise and the complexity of the designation process, we remand to give EPA another opportunity to provide a coherent explanation for its designation.”\textsuperscript{248}

Court have likewise cited the super-deference principle when reviewing adjudications. \textit{Hayward v. U.S. Dep’t of Labor} involved an adjudication for survivor benefits under the Energy Occupational Illness Compensation Program Act, which provides benefits to employees with illnesses caused by exposure to radiation while working for the Department of Energy.\textsuperscript{249} The specific provision at issue allowed employees’ eligible survivors to

\textsuperscript{243} \textit{Id.}
\textsuperscript{244} \textit{Id.} Although the court upheld the rulemaking generally, it did remand the designation applied to a single New York county because that County was designated as nonattainment, even though similarly situated counties in a different region were designated attainment. \textit{Id.} at 50.
\textsuperscript{246} 571 F.3d at 50.
\textsuperscript{247} \textit{Id.} at 52 (citing \textit{State Farm}, 463 U.S. at 43).
\textsuperscript{248} \textit{Id.}
\textsuperscript{249} 536 F.3d 376, 377(5th Cir. 2008).
receive a lump-sum payment for cancer caused by exposure to radiation; however, entitlement required the cancer to have been “at least as likely as not related to employment.” When an individual seeks such a payment, the Office of Workers’ Compensation Programs uses a specified computer software program to construct a probability of causation calculation. While the program’s default settings account for uncertainty from several sources, the model allows the user to adjust those default settings to account for additional uncertainty. According to the program’s manual, adjustments should be made only for sufficient justifications accompanied by written rationales.

The petitioner, a widow, contested the agency’s denial of benefits. The agency had determined that there was just over a twenty-one percent likelihood that the deceased’s cancer was caused by radiation exposure. At a hearing before the agency, the widow raised the protopolitical contentions that the model should have been adjusted to account for the rarity of her husband’s cancer and for its alleged higher correlation with radiation exposure. The Department of Labor consulted with a physicist as well as a representative of the program’s developer, and determined that the default settings should not have been adjusted.

The Fifth Circuit Court of Appeals upheld the district court’s grant of summary judgment to the agency, applying the arbitrary and capricious standard. After reciting the usual State Farm and Overton Park formulations of the standard, the court also noted that, for technical decisions like this one, “we must look at the

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250 Id. (citing 42 U.S.C. § 7384n(b)).
251 Id. at 378. The program uses dose-response data from the Japanese atomic-bomb-survivor cohort, coupled with an employee-specific dose reconstruction.
252 Id.
253 Id.
254 Id. at 379.
255 Id.
256 Id.
257 See id. (describing procedural background and standard of review).
decision not as a chemist, biologist, or statistician that we are qualified neither by training nor experience to be, but as a reviewing court exercising our narrowly defined duty of holding agencies to certain minimal standards of rationality.” Applying these principles, the court reasoned that the agency had specifically addressed both the widow’s contentions, and had reasonably explained its decision. The model already accounted for rare cancers in one of its formulae, and any adjustment would have over-represent the rare cancers. As for the decendent’s cancer being more radiogenic than others, the agency rejected the widow’s proffered study because it involved development of the rare cancer in patients already undergoing radiation treatment for existing cancer.

American Coke, Catawba County, and Hayward illustrate the convergence of the super-deference cases and “ordinary” hard-look cases. In each, the court described the science at issue, the particular contentions of the parties, and the record basis for concluding the agency engaged in reasoned decisionmaking. This substantive approach, combined with the recitations of super

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259 *Id.* at 381.

260 *Id.* at 381.

261 *Id.* at 382.

262 For but one example of an ordinary hard-look case doing the same thing, see *Kennecott Greens Creek Min. Co. v. Mine Safety & Health Admin.*, 476 F.3d 946 (D.C. Cir. 2007) (upholding mine safety standards for exposure to diesel particulate matter).
deference in boilerplate along with *State Farm*, illustrates the lack of any real meaning remaining for the super deference standard. The numerous other recent opinions citing *Baltimore Gas* for super deference illustrate these same tendencies.\(^{263}\)

One final case bears review because it suggests a possible enduring role for super deference. In *Miccosukee Tribe of Indians of Florida v. United States*,\(^{264}\) the Eleventh Circuit Court of Appeals reviewed the Fish and Wildlife Service’s biological opinion on a Corps of Engineers plan to restrict water flowing to a portion of the Everglades. The plan was meant to benefit the endangered Cape Sable Sea Sparrow, but would have negative impacts on another endangered species, the Everglades Snail Kite.\(^{265}\) Among the contentions of the tribe challenging the opinion was that it was arbitrary and capricious because it arrived

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\(^{263}\) See, e.g., Ohio Valley Envtl. Coalition v. Aracoma Coal Co., 556 F.3d 177, 192 (4th Cir. 2009) (citing both *State Farm* and *Baltimore Gas*) (upholding issuance of CWA permits); id. at 201, 205 (using *Baltimore Gas* in analysis); Utah Envtl. Congress v. Russell, 518 F.3d 817, 823 - 24 (10th Cir. 2008) (citing Marsh’s *Baltimore Gas* quotation of super deference along with *State Farm* factors) (describing evidence and upholding forest management plan); Citizens Coal Council v. U.S. EPA, 447 F.3d 879, 890 (6th Cir. 2006) (*en banc*) (citing *State Farm* and *Baltimore Gas* super deference in recitation of standards) (upholding EPA’s CWA effluent limitations for coal mining activities with thorough analysis)); In re Operation of Mo. River Sys. Litig., 421 F.3d 618, 628 (8th Cir. 2005) (citing *State Farm* and Marsh in recitation of standards) (discussing each contention and upholding federal management of Missouri River); Envtl. Def. v. EPA, 369 F.3d 193, 204–05 (2d Cir. 2004) (citing both *State Farm* and *Baltimore Gas* in analysis) (upholding EPA’s approval of state implementation plan under CAA); cf. Tuscon Herpetological Soc’y v. Salazar, 566 F.3d 870, (9th Cir. 2009) (citing *State Farm* and comparing *Baltimore Gas*) (discussing in detail and holding arbitrary and capricious agency’s reliance on “ambiguous” evidence regarding lizard population to withdraw proposed threatened listing). Even recent nuclear-related opinions are consistent with this trend. See, e.g., Morris v. NRC, -- F.3d --, No. 07-9505, 2010 WL 761075 (10th Cir. Mar. 8, 2010) (upholding agency’s approval of uranium mining);

\(^{264}\) 566 F.3d 1257 (11th Cir. 2009).

\(^{265}\) Id. at 1262–64.
at conclusions counter to scientific data in the record and were so implausible as to go beyond a difference in expert opinion.\textsuperscript{266}

The court’s analysis suggests a possible use for the super-deference principle as a balance-tipper. In outlining the applicable standards, the court began by quoting both \textit{State Farm} and the \textit{Baltimore Gas} super-deference principle.\textsuperscript{267} The biological opinion had concluded that the kite would not be jeopardized if the plan’s implementation continued into the early 2010’s. Yet the opinion conceded that the plan would harm about twenty percent of the kite’s habitat.\textsuperscript{268} Further, the plan anticipated water-level-related threats to kite nests, reduced foraging habitat, and reduced abundance of the kite’s primary prey.\textsuperscript{269} The court seemed skeptical; the agency argued that no permanent loss was expected, but cited no authority for the proposition that negative impact on a species’ habitat must be permanent to amount to adverse modification.\textsuperscript{270}

Despite the court’s skepticism, the court upheld the agency’s action. The agency reached its conclusion not solely on the duration of habitat loss, but took into account the species’ life cycle and behavior.\textsuperscript{271} Then the court stated, “[m]oreover, as we pointed out earlier, we do owe a high level of deference to the Service’s scientific determinations. The deference owed the 2006 biological opinion is especially strong because the agency had to predict future hydrologic conditions and estimate the likelihood, extent, and duration of injury to a species.”\textsuperscript{272} Even so, the court carefully underscored the factual context of the case: the opinion

\begin{footnotes}
\item[266] Id. at 1265.
\item[267] Id. at 1264.
\item[268] Id. at 1269.
\item[269] Id. at 1269–70.
\item[270] Id. at 1270 (“Evidently the Service is under the impression that flooding twenty percent of the kites’ critical habitat to a depth that kills the woody vegetation the bird likes to perch on, that drives off the apple snail it likes to eat, and that reduces its nesting success is not ‘adverse modification’ of critical habitat within the meaning of the Act.”).
\item[271] Id. at 1271.
\item[272] Id.
\end{footnotes}
was part of a long-term program to eventually restore the Everglades and hopefully benefit both birds; and the temporary flooding was done in an effort to avoid the extinction of another endangered species. In light of this background, the court ruled that the agency’s determination of no adverse impact was not arbitrary and capricious, but confined the opinion to its facts.

_Miccosukee_ suggests a vestigial use for super-deference principle. Although the court evinced doubt about the actual ability of the plan to prevent harm to the kite population, it used super deference as a balance-tipper. Without needing to separate science from policy, the court mentioned that deference should be “especially strong” because the agency had predicted future hydrologic conditions and estimated the likelihood, extent, and duration of injury to the kite. Those scientific determinations were of course uncertain; they were proto- and mesopolitical predictions.

Although super deference might be viewed as a balance-tipper, the principle has come a long way since _Baltimore Gas_ was announced. Even in _Miccosukee_, it is cited along with the classic hard-look _State Farm_ standard in a way that suggests it has lost its original meaning. Probing further, the analysis the courts apply seems more detailed, and less surficial, than initial cases like _Carstens_ and especially _Ruckelshaus_. Given the historical, contextual, and practical problems associated with super deference, one can hardly mourn the principle’s fall into disuse. But its

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273 Id.
274 Id. at 1271.
demise leaves a question left unarticulated, and unanswered: what ought to be the role of courts in reviewing agency science? It is to that final question that I now turn.

IV. COURTS AS TRANSLATORS

Taking the super-deference cases together as a whole, a different picture of the courts’ role with respect to science emerges. What the *American Coke, Catawba County, Hayward,* and *Miccosukee* courts are doing is conveying vital information about the agency science at issue. They are explaining the science, the uncertainties, and the differing arguments: they are translating the highly scientific information in agency records for public consumption. This observation suggests a normative role for the courts in conveying specialized information, thereby enhancing opportunities for participation and encouraging transparency, deliberation, and accountability.

Scholarship investigating the functions of written judicial opinions focuses on the ability of written opinions to impose a disciplined decisionmaking process; facilitate the precedent system; and legitimate the judicial decisions. I contend, however, that judicial opinions reviewing agency science serve an additional function in providing generalist accounts of specialized information for generalized consumers. Indeed, what we ought to expect from the reasoned decisionmaking requirement is for courts to be able to explain the science, explain the uncertainties, and acknowledge the policy considerations when engaging in review. If a generalist judge is able to do this for a lay audience, it furthers the participatory goals inherent in the constitutional design and it moreover enhances the opportunities for oversight of agency science.

As demonstrated most prominently—but by no means exclusively—by the “good science” movement discussed above, 

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many observers of the courts would like courts’ roles to involve “fixing” bad science. The great practical difficulty, with all of these cases that involve proto- and mesopolitical challenges, is that it is nearly impossible to assess how “right” their outcomes are with respect to science. Barring any obvious scientific or political misconduct, it is perfectly legitimate to think that reasonable scientists, exercising their best professional judgment, would disagree with some of the outcomes, whether in the agencies or the courts. Moreover, the various areas of scientific uncertainty are so specialized that it would require a broad array of specialists to truly assess that “rightness”—something legal commentators are not trained to do. But perhaps these observations make the point: if reasonable scientists would disagree, and agencies adopt metapolicy choices in keeping with the then-governing administration, it is worrisome to think that courts ought to seek their own policy-driven goals in policing agencies too tightly. Nevertheless, the courts fulfill a very important function. They are the bridge between the specialists and the generalists. We may not be able to assess every agency decision from a scientific perspective, but a well-written judicial opinion can convey important information.

Consider the various scenarios that might arise. First, suppose the agency gets positive science right, but the court gets it wrong. The typical remedy, if a court believes an agency erred, is a remand. At that point, the agency would have the opportunity to correct the misunderstanding and perhaps better explain itself the second time. Further, there is an army of judicial watchdogs looking for such judicial errors. Judicial opinions translating science for a lay audience ought to make the watchdog task less burdensome. It seems likely, therefore, that those groups would also identify the error, publicly embarrass the court, and bring it to the agency’s attention on remand.

277 See Wendy E. Wagner, Congress, Science, and Environmental Policy, 1999 U. ILL. L. REV. 181, 199 (describing “scholarly attention to specific deficiencies in environmental laws and the rash of attacks on junk science”).

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Second, suppose the agency and the court both get positive science wrong, resulting in a court’s upholding an agency action. At this point, the hard-look translation is even more important because it ought to illustrate the errors such that the public and Congress could be alerted to the problem, bringing political pressure or corrective statutes to bear on the agency.

More importantly, even if the agency and court both get positive science right, an opinion that sufficiently explains the science and policy at issue provides valuable information highlighting the proto-, meso-, and metapolitical aspects of the case. Take, for example, the American Legion case discussed above. As detailed in the court’s opinion, there were a number of reasons that the agencies involved concluded it would be impossible to design a study of the impacts of exposure in Vietnam veterans. It is difficult to overstate the highly-charged political nature of this issue. Indeed, prior to the case, the House of Representatives Committee on Government Operations issued a report to Congress entitled “The Agent Orange Coverup: A Case of Flawed Science and Political Manipulation.” The report generally accuses the agencies involved of using flawed science, and the Reagan administration of controlling and obstructing the study. Although the truth of these assertions was probably not resolved by the Agent Orange litigation, that truth is somewhat immaterial because the political system ended up compensating exposed veterans even though the science was uncertain. For example, the Veteran’s Health Care Eligibility Reform Act of 1996 provides that “A Vietnam-era herbicide-exposed veteran is eligible . . . for hospital care, medical services, and nursing home care . . . for any disability, notwithstanding that there is insufficient medical

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278 There is a role for detailed dissents here, too. See Ohio Valley Envtl. Coal. v. Aracoma Coal Co., 556 F.3d 177, 226 (4th Cir. 2009) (Michael, J., dissenting) (concluding agency acted arbitrarily); Citizens Coal Council v. U.S. EPA, 447 F.3d 879, 915–23 (6th Cir. 2006) (en banc) (Martin, J., dissenting) (arguing, in detail, why agency’s actions were arbitrary and capricious).


280 Id. [Executive Summary].
evidence to conclude that such disability may be associated with exposure.”

The story of Agent Orange suggests a possible objection to my hypothesis. It is certainly costly to correct agency action after it has become final and been litigated. Although costlier to respond to agency science after, rather than before, agency action, it seems likely that we would want our judicial opinions to be as accessible as possible, particularly when scientific and technical issues are involved. And even if it is preferable to address problems in agencies in the first instance, the very design of our system contemplates an ongoing dialog between the branches.

Further, I recognize that if a court is to provide a strong generalist translation, it must rely on the litigating parties for help. But if agencies are expecting a hard look, they will be incentivized to use normal language and accessible explanations, and challengers of agency action ought to do the same. Consider also the alternative: if super deference is applied as in cases like Carstens and Ruckelshaus, administrative-law values as well as science suffer. Those cases incentivize impenetrable records in the agencies and shallow review by the courts. By viewing the courts as important generalist conveyors of information, we can assess their opinions as generalists and act on the information provided. This approach not only helps the lay audience understand the science-policy continuum, but it reinforces the notions of transparency, deliberation, and accountability that legitimize administrative lawmaking.

282 This approach is known in political science circles as “police-patrol oversight.” Arthur Lupia & Mathew D. McCubbins, Learning from Oversight: Fire Alarms and Police Patrols Reconstructed, 10 J. L. ECON & ORG. 96, 97 (1994) (By definition, police-patrol oversight is likely to be an effective way for legislators to track bureaucratic actions. However, it is also likely to be very costly in terms of the time and resources needed to conduct it.”); see also Frank B. Cross, Shattering the Fragile Case for Judicial Review of Rulemaking, 85 VA. L. REV. 1243, 1303 (1999) (noting high costs).
V. CONCLUSION

This Article has suggested a normative account of the relationship between courts and agencies with respect to science. The traditional view, encompassed in super deference, is that generalist courts ought to be at their most deferential when expert agencies regulate at the frontiers of science. But this position fails to consider that agency science is a policy-infused construct, and it disincentivizes transparency with respect to such policy. It further rewards agencies for amassing impenetrable records, undermining the participatory and deliberative goals of administrative law. In addition, such a superficial judicial review of agency science risks compounding scientific errors, doing little to legitimize the administrative process.

A comprehensive assessment of super deference lays bare these weaknesses, but it also does something more. Indeed, this Article hypothesizes that generalist courts act as translators, providing a bridge between the technical generators of agency science, and the lay consumers of it. This account sees the courts’ generalist perspective as an asset, because it enables the courts to provide accessible descriptions of even the most technical agency science. In turn, courts reinforce administrative-law values by educating Congress, judicial watchdogs, and the public at large about science in the regulatory state.