United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued January 20, 2026 Decided August 18, 2026

No. 24-1193

CHAMBER OF COMMERCE OF THE UNITED STATES OF AMERICA, ET AL.,
PETITIONERS

v.

ENVIRONMENTAL PROTECTION AGENCY AND LEE M. ZELDIN, IN HIS OFFICIAL CAPACITY AS ADMINISTRATOR, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,
RESPONDENTS

CLEAN CAPE FEAR, ET AL.,
INTERVENORS

Consolidated with Nos. 24-1261, 24-1266, 24-1271, 24-1272

On Petitions for Review of a Final Rule
of the Environmental Protection Agency

Elbert Lin argued the cause for petitioners. With him on the briefs were *Andrew R. Varcoe*, *Stephanie A. Maloney*, *Paul T. Nyffeler*, *David M. Parker*, *Matthew Z. Leopold*, *Christopher*

L. Bell, *Susan Parker Bodine*, *Richard S. Moskowitz*, and *Tyler Kubik*. *Brittany M. Pemberton* entered an appearance.

Michael B. Kimberly and *Michael A. Tilghman II* were on the brief for amici curiae National Association of Manufacturers and Printing United Alliance in support of petitioners. *Nicole E. Wittstein* entered an appearance.

Douglas A. Hastings and *Mark Donatiello* were on the brief for amicus curiae Superfund Settlements Project in support of petitioners.

Erica Spitzig, *Aaron M. Herzig*, *Anne M. McClellan*, and *David C. Roper* were on the brief for amicus curiae Passive Receivers in support of remand.

Riley W. Walters, Counsel to the Assistant Attorney General, U.S. Department of Justice, argued the cause for respondents. On the brief were *Adam R.F. Gustafson*, Principal Deputy Assistant Attorney General, and *Jin Hyung Lee*, Attorney, and *Elizabeth G. Berg* and *Noel M. Johnson*, Attorneys, U.S. Environmental Protection Agency.

Jonathan Kalmuss-Katz argued the cause for intervenors Clean Cape Fear, et al. in support of respondents. With him on the brief were *Lillian Zhou* and *Alana R. Reynolds*.

Letitia James, Attorney General for the State of New York, *Barbara D. Underwood*, Solicitor General, *Judith Vale*, Deputy Solicitor General, *Joshua N. Cohen*, Assistant Solicitor General, *Philip M. Bein*, Senior Counsel, *Kyle Burns*, Assistant Attorney General, *Mihir Desai*, Assistant Attorney General, *Kristin K. Mayes*, Attorney General for the State of Arizona, *Philip J. Weiser*, Attorney General for the State of Colorado, *William Tong*, Attorney General for the State of Connecticut, *Brian L. Schwalb*, Attorney General for the District of Columbia, *Kwame Raoul*, Attorney General for the State of Illinois, *Anthony G. Brown*, Attorney General for the State of Maryland, *Andrea J. Campbell*, Attorney General for the Commonwealth of Massachusetts, *Dana Nessel*, Attorney General for the State of Michigan, *Keith Ellison*, Attorney General for the State of Minnesota, *Matthew J. Platkin*, Attorney General for the State of New Jersey, *Raúl Torrez*, Attorney General for the State of New Mexico, *Dan Rayfield*, Attorney General for the State of Oregon, *Nicholas W. Brown*, Attorney General for the State of Washington, and *Josh Kaul*, Attorney General for the State of Wisconsin, were on the brief for amici curiae States of New York, et al. in support of respondents.

Before: MILLETT, KATSAS, and RAO, *Circuit Judges*.

Opinion for the Court filed by *Circuit Judge* MILLETT.

MILLETT, *Circuit Judge*: Perfluorooctanoic Acid ("PFOA") and Perfluorooctanesulfonic Acid ("PFOS") are two compounds in a large group of human-made substances commonly referred to as "forever chemicals." In 2024, the Environmental Protection Agency designated PFOA and PFOS as "hazardous substances" under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. EPA based its determination on extensive studies that link PFOA and PFOS exposure to serious health conditions in humans, including cancer and developmental delays.

Seven interest groups representing industries that use, transport, or discharge PFOA and PFOS petitioned this court to overturn EPA's decision. We deny those petitions.

I

A

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act, Pub. L. No. 96-510, 94 Stat. 2767, in 1980, and added to that regime in 1986 with the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 Stat. 1613, now codified together at 42 U.S.C. § 9601 *et seq.* ("CERCLA"). CERCLA governs the cleanup of "hazardous substances" and "pollutants or contaminants" from the environment. 42 U.S.C. §§ 9604, 9606. The Act was Congress's response to a series of high-profile toxic chemical releases, including the infamous dump of thousands of tons of chemicals in Love Canal, New York that led to birth defects, miscarriages, and a devastated community. *See* S. REP. NO. 848, 96th Cong., 2d Sess. 4–5, 8–10 (1980); *see also Niagara Mohawk Power Corp. v. Chevron U.S.A., Inc.*, 596 F.3d 112, 120 & n.5 (2d Cir. 2010).

CERCLA classifies as a "hazardous substance" those substances listed in or designated under other environmental laws, like the Clean Water Act. There are currently over 800 such hazardous substances. 42 U.S.C. § 9601(14); 40 C.F.R. § 302.4 table (enumerating those substances). CERCLA also authorizes EPA to designate as additional "hazardous substances" those "elements, compounds, mixtures, solutions, and substances" that, "when released into the environment[,] may present substantial danger to the public health or welfare or the environment[.]" 42 U.S.C. § 9602(a).

CERCLA both encourages "timely cleanup" of harmful chemical releases and hazardous waste sites and "ensure[s] that the costs" of cleanups are "borne by those responsible" for the pollution. *Atlantic Richfield Co. v. Christian*, 140 S. Ct. 1335, 1345 (2020) (quoting *CTS Corp. v. Waldburger*, 573 U.S. 1, 4 (2014)).

CERCLA provides for two kinds of cleanups: (1) removal actions and (2) remedial actions. 42 U.S.C. § 9601(23), (24), (25). Removal actions are short-term measures aimed at promptly preventing or mitigating a release of dangerous chemicals. J.A. 447–448.

Remedial actions, on the other hand, are longer-term efforts involving "a complex, multi-phase process" aimed at "significantly reduc[ing] serious but not immediately life-threatening risks" from chemical releases. J.A. 447; *see* 42 U.S.C. § 9601(24). Remedial actions are generally conducted at locations listed on the "National Priorities List," a statutorily mandated list of sites across the country that present the greatest danger to public health. 42 U.S.C. § 9605(a)(8)(A)–(B); *Linemaster Switch Corp. v. EPA*, 938 F.2d 1299, 1301 (D.C. Cir. 1991). They are commonly known as "Superfund sites[.]" *Atlantic Richfield Co.*, 140 S. Ct. at 1346.

Cleanups can proceed along two statutory pathways. First, "Section 106" cleanups are triggered only by the release of a "hazardous substance[.]" 42 U.S.C. § 9606(a). For these cleanups, EPA may compel responsible parties to undertake the cleanup in the first instance. *Id.*

Second, "Section 104" cleanups can be triggered by the release of either (1) a "hazardous substance" or (2) a "pollutant or contaminant" if it "may present an imminent and substantial danger to the public health or welfare[.]" 42 U.S.C. § 9604(a)(1). A "pollutant or contaminant" is defined as including:

> [A]ny element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring[.]

42 U.S.C. § 9601(33).

Within Section 104 cleanups, who foots the bill depends on what needs cleaning up. When EPA leads the cleanup of hazardous substances, the responsible polluters can later be made to cover the costs through cost-recovery actions, so long as the cleanups were "not inconsistent with the national contingency plan[.]" 42 U.S.C. § 9607(a); *Cooper Indus., Inc. v. Aviall Servs., Inc.*, 543 U.S. 157, 161 (2004). The National Contingency Plan, in turn, is a series of statutorily required regulations that prescribe the methods and scope of Section 104 cleanups. 42 U.S.C. § 9605; 40 C.F.R. pt. 300.

Such refund actions are not possible for releases of pollutants or contaminants, however. *See* 42 U.S.C. § 9607(a). That means that Section 104 cleanups of pollutants or contaminants are paid for entirely by public funds, either (1) through the Superfund, which Congress set up to pay for major CERCLA cleanup efforts, 42 U.S.C. § 9611(a); *Ohio v. Department of the Interior*, 880 F.2d 432, 439 (D.C. Cir. 1989), or (2) through appropriations by Congress, *see* GOVERNMENT ACCOUNTABILITY OFF., GAO-15-812, SUPERFUND: TRENDS IN

FEDERAL FUNDING AND CLEANUP OF EPA'S NONFEDERAL NATIONAL PRIORITIES LIST SITES 12 (2015).

B

Perfluoroalkyl and Polyfluoroalkyl Substances ("PFAS") is the scientific name for a broad category of human-made chemicals. Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances, 89 Fed. Reg. 39,124, 39,125 (May 8, 2024) ("*Designation*"). They have been used in the United States since the 1940s to create water- and oil-resistant products like cookware, rain-repellent clothing, and firefighting foam. *Id.* at 39,126.

PFAS take hundreds of years to degrade in the environment and take decades to be eliminated from human bodies, earning them the title "forever chemicals[.]" *Designation*, 89 Fed. Reg. at 39,126 (quotation marks omitted). PFAS have also been linked to many adverse health effects, including cancer, developmental effects in children, and cardiovascular conditions. *See id.* at 39,145–39,146.

EPA has historically regulated two of the most common PFAS—PFOA and PFOS—as "pollutants or contaminants" under CERCLA. *Designation*, 89 Fed. Reg. at 39,153.

Several years ago, as scientific evidence of the harms posed by PFOA and PFOS accumulated, EPA began considering whether to designate the two chemicals as "hazardous substances" under CERCLA. In studying the issue, EPA published in August 2022 an Economic Assessment delving into a quantitative cost-benefit analysis of the direct impacts of such a designation and a qualitative analysis of the indirect impacts. J.A. 103–111. The Assessment also requested public comment on thirteen discreet issues regarding its initial cost-benefit analyses. J.A. 118.

One month later, EPA published a Notice of Proposed Rulemaking suggesting the designation of PFOA and PFOS as "hazardous substances" under CERCLA. *See* Designation of [PFOA] and [PFOS] as CERCLA Hazardous Substances, 87 Fed. Reg. 54,415, 54,417 (Sept. 6, 2022).

In doing so, EPA requested comments specifically on:

> (1) Whether CERCLA section 102(a) precludes, allows, or requires consideration of cost in designation decisions, and, if so, (2) which costs and benefits of those discussed in the EA [Economic Assessment] should be considered, (3) whether additional benefits and costs not identified in the EA should be considered, (4) if indirect benefits and costs are considered, how they should be assessed in light of the discretion and uncertainties described above, (5) how benefits and costs could be incorporated into the designation decision, and (6) whether designation would be justified if costs were to be considered in the Agency's designation decision.

87 Fed. Reg. at 54,423.

After receiving comments, including from Petitioners, EPA issued its final rule in May 2024. *Designation*, 89 Fed. Reg. at 39,124; *e.g.*, J.A. 681, 687, 714. EPA used two factors to determine that PFOA and PFOS qualified as "hazardous substances." First, EPA considered "the potential harm to humans or the environment from exposure to the substance (i.e., hazard)," and second, "how the substance potentially moves, persists, and/or changes when in the environment (i.e., environmental fate and transport)." *Designation*, 89 Fed. Reg. at 39,141. EPA concluded that both weighed in favor of designation, crediting the significant body of research on adverse health effects as well as the tendency of PFOA and PFOS to remain for many years in the environment and to bioaccumulate in human bodies. *See id.* at 39,143–39,148.

EPA then assumed without deciding that CERCLA required a cost-benefit analysis of that designation. *Designation*, 89 Fed. Reg. at 39,143. EPA's evaluation of the costs and benefits contained both "quantitative and qualitative" considerations. *Id.* at 39,149. EPA published the cost-benefit analysis in a document entitled "Regulatory Impact Analysis[,]" and attached it to the final rule. *Id.* at 39,149; J.A. 368–659.

EPA's designation of PFOA and PFOS as "hazardous substances" has three direct impacts on regulated parties.

First, parties responsible for a release of more than one pound of PFOA or PFOS must report that release to national authorities, 42 U.S.C. §§ 9602(b), 9603; *Waterkeeper Alliance v. EPA*, 853 F.3d 527, 531 (D.C. Cir. 2017), and, in some cases, to local authorities and the public, 42 U.S.C. §§ 9611(g), 11004; 40 C.F.R. § 355.

Second, federal agencies selling land contaminated with PFOA and PFOS generally must provide notice of the presence of hazardous substances. 42 U.S.C. § 9620(h).

Third, shippers must identify and mark shipments of PFOA and PFOS weighing more than one pound, pursuant to the Hazardous Materials Transportation Act of 1975, 49 U.S.C. § 5101 *et seq.*, 42 U.S.C. § 9656(a); 49 C.F.R. § 171.1.

The Designation leads to indirect impacts as well. In some circumstances, after several more regulatory steps, EPA may compel polluters to abate and clean up releases of PFOA or PFOS. 42 U.S.C. § 9606. In other circumstances, the federal government, States, and adversely affected private parties may pursue enforcement actions to recover cleanup costs from responsible polluters. 42 U.S.C. § 9607; *see* 40 C.F.R. §§ 300.410, 300.420; 42 U.S.C. § 9606(a).

Seven interest groups for various companies that use, transport, or discharge PFOA and PFOS in their manufacturing, transportation, and waste management ("Petitioners"), petitioned this court to vacate the Designation. Petitioners challenge EPA's (1) interpretation of "hazardous substances" to include PFOA and PFOS as contrary to law, 5 U.S.C. § 706(2)(A); (2) cost-benefit analysis as arbitrary and capricious, *id.*, and in violation of Administrative Procedure Act's notice requirement, *id.* § 553; and (3) decision to regulate in the face of uncertainties as arbitrary and capricious, *id.* § 706(2)(A).[1]

II

We have exclusive jurisdiction over these petitions for review of a "regulation promulgated under" CERCLA. 42 U.S.C. § 9613(a).

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[1] Petitioners are the Chamber of Commerce of the United States of America ("Chamber of Commerce"), American Chemistry Council, American Fuel & Petrochemical Manufacturers, Associated General Contractors of America, Inc., National Waste & Recycling Association, Institute of Scrap Recycling Industries, d/b/a the Recycled Materials Association, and American Forest & Paper Association.

Petitioners have the jurisdictionally required Article III associational standing. *See, e.g.*, *Students for Fair Admissions, Inc. v. President & Fellows of Harvard College*, 143 S. Ct. 2141, 2157 (2023). Petitioners have identified member companies that use PFOA- and PFOS-containing products and attest that they "are already seeing impacts on their overall project expenses" in complying with the terms of CERCLA. *See* Decl. of Leah Pilconis ¶¶ 19, 23–24, 27–28; Decl. of Charles Mull ¶¶ 7, 9–12; Decl. of John M. Perkey ¶¶ 18–20; Decl. of Anne Germain ¶ 10. Those increased expenses are concrete injuries in fact assertedly caused by the Designation that could be redressed by court action. In addition, the associations' interests in protecting companies from CERCLA's liability regime are germane to their missions of promoting the financial and regulatory interests of private industry. *See* Decl. of Martin Durbin ¶ 5; Decl. of Anne Germain ¶ 3; Decl. of Leah Pilconis ¶¶ 4–5. Petitioners also have shown that the participation of individual members is not required to seek the equitable relief of vacatur. *See Center for Biological Diversity v. EPA*, 56 F.4th 55, 67 (D.C. Cir. 2022).

In reviewing Petitioners' contrary to law claims, we must independently determine the "best" reading of CERCLA's text by "applying all relevant interpretive tools." *Loper Bright Enters. v. Raimondo*, 144 S. Ct. 2244, 2266 (2024). Our review of Petitioners' arbitrary and capricious claims is "deferential" to the agency. *FCC v. Prometheus Radio Project*, 141 S. Ct. 1150, 1158 (2021) ("A court simply ensures that the agency has acted within a zone of reasonableness and, in particular, has reasonably considered the relevant issues and reasonably explained the decision."); *see also Meritor, Inc. v. EPA*, 966 F.3d 864, 869 (D.C. Cir. 2020) ("In conducting this review, we afford the EPA significant deference with respect to the highly technical issues involved.") (formatting modified).

Finally, we must set aside a rule if the agency failed to provide the requisite notice and comment and the petitioner has shown prejudice. 5 U.S.C. § 553(b); *Petaluma FX Partners, LLC v. Commissioner*, 792 F.3d 72, 81 (D.C. Cir. 2015).

III

Petitioners advance three challenges to the Designation. They contend that: (1) EPA misinterpreted the term "may present substantial danger" in CERCLA's definition of a hazardous substance; (2) EPA's cost-benefit analysis provided insufficient notice to the parties; and (3) EPA's cost-benefit analysis and decision to regulate in the face of uncertainty were arbitrary and capricious.

None of those claims succeeds. The plain language of Section 9602 allows EPA to designate as hazardous substances chemicals like PFOA and PFOS that repeatedly have been linked to adverse health effects in myriad peer-reviewed studies. EPA provided adequate notice of its cost-benefit analysis underlying the ultimate Designation through its earlier Economic Assessment and request for comments on it. Finally, EPA acted reasonably based on the record before it in its calculation of costs and benefits, and in its decision to take this regulatory step of designating PFOA and PFOS to be hazardous substances.

A

Petitioners argue that, in interpreting the phrase "may present substantial danger" in CERCLA's definition of a hazardous substance, EPA had to find that substantial danger "will" occur upon release to avoid overinclusion and to comply with the nondelegation and void-for-vagueness doctrines. Pet'rs' Reply Br. 14; Pet'rs' Opening Br. at 31–32. Petitioners are wrong as a matter of statutory text and precedent.

1

The plain statutory text refutes Petitioners' argument. CERCLA provides that EPA "shall" "designat[e] as hazardous substances" those "elements, compounds, mixtures, solutions, and substances which, when released into the environment may present substantial danger to the public health or welfare or the environment[.]" 42 U.S.C. § 9602(a).

In making the Designation, EPA determined that "may" means "at a minimum, there is a possibility" that the released substance presents a substantial danger to public health, welfare or the environment, and that "EPA need not have certainty" of that danger. *Designation*, 89 Fed. Reg. at 39,141.

Petitioners challenge EPA's interpretation of "may[,]" arguing that reading it to mean a "possibility" of substantial harm lacks "fix[ed] boundaries" and is "unreasonably broad." Pet'rs' Opening Br. 28–29 (secondly quoting *Loper Bright*, 144 S. Ct. at 2263). According to Petitioners, "may" in the statute means that whenever a substance is released, the danger "will be actually existing or real." Pet'rs' Reply Br. 12–13 (quotation marks omitted).

EPA has the best reading of the statute as a matter of text and context.

To start, the statute straightforwardly uses "may" to refer to the chance of harm to public health, not its certainty. The primary meaning of "may" is one of contingency both in ordinary usage and in dictionaries at the time of CERCLA's enactment. *See May*, BLACK'S LAW DICTIONARY (5th ed. 1979) ("An auxiliary verb qualifying the meaning of another verb by expressing ability, competency, liberty, permission, possibility, probability or contingency."); *May*, BALLENTINE'S LAW DICTIONARY 785 (3d. ed. 1969) ("Ordinarily a permissive, rather than a mandatory, term in a statute."); *May*, OXFORD AMERICAN DICTIONARY 410 (1980) ("expressing possibility (*it may be true*)"); *May*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 1396 (1981) ("be in some degree likely to" as in "you [may] be right"); *May*, WEBSTER'S NEW WORLD DICTIONARY 463 (2d Concise ed. 1982) ("possibility or likelihood [it *may* rain]"); *May*, THE RANDOM HOUSE DICTIONARY OF THE ENGLISH LANGUAGE 1189 (2d unabr. ed. 1987) ("used to express possibility" as in "[*i*]*t may rain*").

Even more to the point, the statute says when that contingency should be assessed, which is at the time—"when"—the substance is "released into the environment[.]" 42 U.S.C. § 9602(a). In that way, the statute directs EPA to forecast the future risk of harm at the time of a release.

Petitioners' insistence that the harm must be certain to occur at the time of release rewrites rather than interprets the statutory text. If Congress wanted to adopt Petitioners' preferred approach, it would have said: "substances which, when released into the environment ~~may~~ **will** present substantial danger to the public health or welfare or the environment[.]" *Compare* Pet'rs' Reply Br. 12–13 ("[I]f the condition of release is satisfied, the result of substantial danger to the public health or welfare or the environment will be actually existing or real.") (quotation marks omitted), *with* 42 U.S.C. § 9602(a) (using simply "may").

Also, the dictionaries on which Petitioners rely refute their argument, providing that the word "may" will not be treated as a word of command or requirement "unless there is something in [the] context" of a statute "to indicate that it was used in such sense." *May*, BLACK'S LAW DICTIONARY (5th ed. 1979); *see also May*, BALLENTINE'S LAW DICTIONARY 785 (3d. ed. 1969) ("Discretionary in its grammatical sense, but subject to construction as mandatory *where the sense of the entire context impels such construction*[.]") (emphasis added). Missing from Petitioners' argument is anything in the context that impels overriding the ordinary meaning of "may[.]"

Petitioners also forget that, in CERCLA, Congress wrote a statute that would operate on the basis of scientific knowledge and information about health and environmental risks. Congress presumably knew that "[s]cientists typically speak not of certainty, but of probability; they are trained to act on probabilities that statistically constitute 'certainties.'" *Ethyl Corp. v. EPA*, 541 F.2d 1, 25 n.52 (D.C. Cir. 1976) (*en banc*); *see also id.* ("Even scientific 'facts' are not certain, but only theories with high probabilities of validity."); *cf. Center for Biological Diversity v. EPA*, 749 F.3d 1079, 1090 (D.C. Cir. 2014) ("[A statute] may at times require * * * action in the face of uncertainty, lest 'the precautionary purpose of the statute' be undermined.") (quoting *Ethyl Corp.*, 541 F.2d at 28). To require absolute scientific certainty as to what will happen upon every individual release of a dangerous chemical would have been to legislatively paralyze CERCLA.

Petitioners worry that such an ordinary and contextual reading of the text would permit EPA to categorize table salt as a hazardous substance. Petitioners' argument overlooks the required finding that a release may present "substantial danger" to public health, welfare, or the environment. 42 U.S.C. § 9602(a). That criterion has real bite. The risk of harm must be both serious and real, not hypothesized. *See Substantial*, BLACK'S LAW DICTIONARY (5th ed. 1979) ("actually existing; real; not seeming or imaginary; not illusive; solid; true; veritable"); *Substantial*, OXFORD AMERICAN DICTIONARY 683 (1980) ("of considerable amount or intensity or validity"); *Substantial*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 2280 (1981) ("considerable in amount, value, or worth"); *Substantial*, XVII THE OXFORD ENGLISH DICTIONARY 66 (2d ed. 1989) ("That is, or exists as, a substance; having a real existence"); *Danger*, BLACK'S LAW DICTIONARY (5th ed. 1979) ("Jeopardy; exposure to loss or injury; peril."); *Danger*, OXFORD AMERICAN DICTIONARY 160 (1980) ("liability or exposure to harm or to death"); *Danger*, WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 573 (1981) ("Harm, Injury, Damage") (capitalization altered); *Danger*, IV THE OXFORD ENGLISH DICTIONARY 241 (2d ed. 1989) ("Liability or exposure to harm or injury; the condition of being exposed to the chance of evil; risk, peril.").

More to the point, this case does not require rigidly defining the precise boundaries of the term "substantial danger[.]" That is because, for all their verbal debating, Petitioners tellingly do not dispute that PFOA and PFOS qualify as substances that may pose a substantial risk to public health, welfare, and the environment if released. Nor could they. The Designation cited dozens of studies showing "[c]ollectively" that "each PFOA and PFOS individually pose[s] a human health hazard[.]" *Designation*, 89 Fed. Reg. at 39,144. The Designation spent three full pages cataloguing just "some" of the health conditions associated with PFOA and PFOS exposure: developmental effects including decreased infant birth weight and effects on fetuses during pregnancy; cardiovascular impacts like increased cholesterol in adolescents; increased liver enzymes, which can impact liver function; immunosuppression in adults and children; impacted thyroid function; and preeclampsia and gestational hypertension in pregnant women. *Id.* at 39,144–39,146.

That is not all. After reviewing toxicity assessments in drinking water, EPA classified PFOA and PFOS as "likely to be carcinogenic to humans[.]" *Designation*, 89 Fed. Reg. at 39,143 (formatting modified). The PFOA determination was based on "evidence of kidney and testicular cancer in humans and Leydig cell tumors, pancreatic acinar cell tumors, and hepatocellular adenomas in rats." *Id.* at 39,144. So too was the PFOS determination based on "evidence of hepatocellular tumors in humans and rats, pancreatic islet cell carcinomas in male rats, and mixed but plausible evidence of bladder, prostate, kidney, and breast cancers in humans[.]" *Id.*

EPA is not alone in these concerns. As the Designation noted, the International Agency for Research on Cancer, a subsidiary of the World Health Organization, has categorized PFOA as "carcinogenic to humans" and PFOS as "possibly carcinogenic to humans[.]" *Designation*, 89 Fed. Reg. at 39,143.

Lastly, Petitioners' worry overlooks the political accountability issues that would arise from a misguided designation. In addition, Petitioners could voice objections to an unreasonable designation in the ordinary course of notice and comment rulemaking and, if necessary, bring suit to challenge the final designation as contrary to law.

For all of these reasons, the phrase "may present a substantial risk of harm" when released into the environment carries its plain meaning of a scientifically possible substantial risk of harm upon release.[2]

2

Petitioners next argue that the definition of "hazardous substances" must be read more narrowly than "pollutant or contaminant" because "CERCLA confers significantly more authority to address 'hazardous substances' than 'pollutants or contaminants.'" Pet'rs' Opening Br. 33. Petitioners are mistaken.

To start, Petitioners' insistence that courts must enforce some inflexible hierarchy between these two categories is not supported by anything in the statutory text. Their definitions each require a probability of substantial danger to the public or environmental organisms. *Compare* 42 U.S.C. § 9601(33) (defining a "pollutant or contaminant" as a substance which "will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations" in animals and humans), *and id.* § 9604(a) (requiring EPA to determine that pollutants or contaminants "may present an imminent and

[2] Petitioners urge us not to afford EPA's interpretation any "respect" in our interpretation of Section 9602 because of (1) a 1983 notice of proposed rulemaking, which never materialized into a final rule, proposing quantitative metrics to operationalize Section 9602, and (2) regulations with more concrete metrics that implement Section 9605, a part of CERCLA that does not use the word "may." Pet'rs' Opening Br. 35 & n.12 (citing *Loper Bright Enters.*, 144 S. Ct. at 2258). Contrary to Petitioners' contention, non-rules and definitions in materially different regulations do not show inconsistency with prior agency positions. More to the point, our decision is made *de novo* without deference to EPA's view.

substantial danger to the public health or welfare" before initiating cleanup), *with id.* § 9602(a) (defining "hazardous substances" as those which "may present substantial danger to the public health or welfare or the environment").

So CERCLA does not draw a comparative-harm line between pollutants or contaminants and hazardous substances. Instead, it creates two distinctive cleanup regimes with two different paths for designation. The difference in how hazardous substances and pollutants or contaminants are treated in cleanups turns on (1) the imminence of harm and (2) whether the risk of harm posed is uniform or could vary based on site-specific conditions.

Pollutants or contaminants are identified for clean up on a site-by-site basis based both on the risk of harm and—uniquely—the harm's "imminen[ce.]" 42 U.S.C. § 9604(a)(1); *Designation*, 89 Fed. Reg. at 39,172. In addition, CERCLA does not require EPA to promulgate any regulations or make formal certifications to designate substances as pollutants or contaminants, presumably because the imminence of harm may not allow for such delays. *See* 42 U.S.C. § 9604(a)(1).

On the other hand, CERCLA mandates that EPA designate hazardous substances in a single rulemaking that then applies to all CERCLA sites. 42 U.S.C. § 9602. While Section 9602 does not explicitly call for notice and comment rulemaking, EPA opted to do so for the PFOA and PFOS Designation, and committed itself to further notice-and-comment rulemaking if it were to update the Designation. *Designation*, 89 Fed. Reg. at 39,174.

To the extent the statutory scheme allows substances, like PFOA and PFOS, to originally qualify as pollutants or contaminants and then later, be designated hazardous substances based on advances in scientific knowledge, that is the "belt and suspenders approach" that CERCLA's text and context straightforwardly allow. *Atlantic Richfield Co.*, 140 S. Ct. at 1350 n.5.

3

Finally, Petitioners contend that EPA's reading of Section 9602 runs afoul of the nondelegation and void-for-vagueness doctrines, and that we should reject EPA's reading to avoid those constitutional questions. Pet'rs' Opening Br. 31–32. There are no such constitutional concerns in this case.

Allowing agencies to make discretionary judgments informed by evidence fully comports with the nondelegation doctrine as long as "Congress has set out an 'intelligible principle' to guide what it has given the agency to do." *FCC v. Consumers' Rsch.*, 145 S. Ct. 2482, 2497 (2025) (quoting *J.W. Hampton, Jr., & Co. v. United States*, 276 U.S. 394, 409 (1928)). Under the "intelligible principle" test, courts require Congress to "ma[ke] clear both the general policy that the agency must pursue and the boundaries of its delegated authority." *Id.* (formatting modified).

Congress has laid out the "general policy" for EPA to pursue—regulating substances that are particularly harmful to humans and the environment by creating a cleanup and cost-allocation scheme that puts the onus on polluters rather than taxpayers. *See* 42 U.S.C. §§ 9602, 9606, 9607; *cf. United States v. E.I. Dupont De Nemours & Co.*, 432 F.3d 161, 169 (3d Cir. 2005) ("Congress's decision to hold responsible parties strictly liable for the government's costs of responding to hazardous waste contamination [in CERCLA] is both a reasonable exercise of legislative authority and different in kind from the unbounded delegation" found in cases that run afoul of the nondelegation doctrine.).

Congress also has set fixed "boundaries" for the agency's authority and "provided sufficient standards" for courts to police agency compliance. *Consumers' Rsch.*, 145 S. Ct. at 2497. For example, to categorize substances as "hazardous," EPA must determine that they are harmful enough to risk "substantial danger" to human welfare or the environment. 42 U.S.C. § 9602(a).

Tying EPA's decisions to scientific findings based on a public health standard easily satisfies the requirement that there be an intelligible principle to limit agency action. *See, e.g.*, *Consumers' Rsch.*, 145 S. Ct. at 2501–2503 (finding an intelligible principle in the Telecommunications Act's requirement that subsidies paid by telecommunications carriers be enough to "contribute" to "sufficient mechanisms * * * to preserve and advance universal service[,]" 47 U.S.C. § 254(d)); *Whitman v. American Trucking Ass'ns*, 531 U.S. 457, 465 (2001) (same for Clean Air Act's delegation to EPA to set ambient air quality standards "'the attainment and maintenance of which * * * are requisite to protect the public health' with 'an adequate margin of safety'") (quoting 42 U.S.C. § 7409(b)(1)); *Touby v. United States*, 500 U.S. 160, 163, 165 (1991) (same for Controlled Substances Act's authorization of the Attorney General to temporarily add a substance to a controlled drug schedule if doing so is "necessary to avoid an imminent hazard to the public safety") (quoting 21 U.S.C. § 811(h)(1)); *see also Sessions v. Dimaya*, 584 U.S. 148, 159 (2018) ("Many perfectly constitutional statutes use imprecise terms like 'serious potential risk' * * * or 'substantial risk[.]'").

Section 9602's plain meaning also fully comports with the Fifth Amendment's Due Process Clause by affording "the person of ordinary intelligence a reasonable opportunity" to predict whether a substance could be designated hazardous. *Grayned v. City of Rockford*, 408 U.S. 104, 108–109 (1972). Notice is particularly easy to find here given that PFOA and PFOS previously have been designated under CERCLA as "pollutant[s] or contaminant[s]" that "will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations[.]" 42 U.S.C. § 9601(33); *Designation*, 89 Fed. Reg. at 39,173. That alone provided fair notice that PFOA and PFOS might also qualify as "hazardous substances[.]"

Beyond that, Petitioners' members are seasoned participants in the highly regulated area of chemical substances' commercial uses. They were provided ample notice and opportunity to be heard through the notice and comment rulemaking process that designated PFOA and PFOS as hazardous substances, followed by judicial review. *See Village of Hoffman Ests. v. The Flipside, Hoffman Ests., Inc.*, 455 U.S. 489, 498 (1982) ("[E]conomic regulation is subject to a less strict vagueness test because * * * the regulated enterprise may have the ability to clarify the meaning of the regulation by its own inquiry, or by resort to an administrative process.").

For all those reasons, affording Section 9602's "may present substantial danger to the public health or welfare or the environment" language its ordinary meaning comports fully with the nondelegation doctrine and due process. Petitioners' contrary to law claim fails.

B

The second chapter in Petitioners' challenge focuses on EPA's cost-benefit analysis. Petitioners argue that EPA (1) violated the APA's notice requirement by failing to disclose its Regulatory Impact Analysis until publication of the final rule, and (2) conducted its cost-benefit analysis in an arbitrary and capricious manner. Pet'rs' Opening Br. 41–49.

Petitioners' arguments do not hold up. The Regulatory Impact Analysis was a logical outgrowth of the Economic Assessment's cost-benefit analysis, which was then supplemented with data to address comments made by Petitioners and others. EPA also reasonably explained its quantitative analyses.[3]

1

First, Petitioners contend that EPA failed to provide adequate notice of its cost-benefit analysis. While they acknowledge that the Economic Assessment provided with the notice of proposed rulemaking contained a cost-benefit analysis, Petitioners argue that the final Regulatory Impact Analysis differed such that they were no longer provided sufficient notice. Pet'rs' Opening Br. 43.

The APA requires that a notice of proposed rulemaking include "either the terms or substance of the proposed rule or a description of the subjects and issues involved," 5 U.S.C. § 553(b)(3), and "give interested persons an opportunity to

[3] Because we reject Petitioners' challenges to EPA's cost-benefit analysis, we need not decide whether EPA was required to consider such costs in the first instance. EPA assumed without deciding that it had to do so, 89 Fed. Reg. at 39,143, and we do the same.

participate in the rule making through submission of written data, views, or arguments," *id.* § 553(c). Notice "ensure[s] that agency regulations are tested via exposure to diverse public comment," promotes fairness to impacted parties, and gives them "an opportunity to develop evidence in the record to support their objections[.]" *International Union, United Mine Workers v. Mine Safety & Health Admin.*, 626 F.3d 84, 95 (D.C. Cir. 2010) (formatting modified). This notice requirement extends to "critical information" on which the rule is based. *GPA Midstream Ass'n v. Department of Transportation*, 67 F.4th 1188, 1197 (D.C. Cir. 2023).

Our test for whether an agency has met the APA's notice requirement is whether "affected parties should have anticipated the final rule in light of the notice." *Brennan v. Dickson*, 45 F.4th 48, 69 (D.C. Cir. 2022) (quotation marks omitted). The key question is whether the final rule is a "logical outgrowth" of the proposal. *National Ass'n of Broadcasters v. FCC*, 147 F.4th 978, 992 (D.C. Cir. 2025) (quotation marks omitted).

The Regulatory Impact Analysis was a logical outgrowth of the Economic Assessment and notice and comment process. First, its cost-benefit analysis reasonably followed from the notice of proposed rulemaking and related Economic Assessment. Second, the additional cost data was not information "critical" to the final decision.

a

Petitioners first contend that they lacked notice that EPA would pursue a cost-benefit analysis in the final rule. Because they had been put on notice by the Economic Assessment, and the Regulatory Impact Analysis was the logical outgrowth of that initial cost-benefit analysis, Petitioners' argument fails.

The content of a final rule is the logical outgrowth of an agency's earlier proposal if "a party c[ould] reasonably anticipate" the outcome "in light of the initial notice as a guidepost." *National Ass'n of Broadcasters*, 147 F.4th at 992 (quotation marks omitted).

Petitioners do not and cannot dispute that they were on notice that EPA was considering a full cost-benefit analysis that would build on the initial cost-benefit analysis already provided in the Economic Assessment, which was incorporated into the notice of proposed rulemaking. 87 Fed. Reg. at 54,418 n.4. The notice, after all, included the following "Request for Comment":

> EPA is taking comment on its approach to the consideration of costs, including: (1) Whether CERCLA section 102(a) precludes, allows, or requires consideration of cost in designation decisions, and, if so, (2) which costs and benefits of those discussed in the EA [Economic Assessment] should be considered, (3) whether additional benefits and costs not identified in the EA should be considered, [and] (4) if indirect benefits and costs are considered, how they should be assessed in light of the discretion and uncertainties described above[.]

Id. at 54,423.

Petitioners next contend that even if they did have notice that EPA would conduct a cost-benefit analysis, the Economic Assessment "bore no resemblance" to the Regulatory Impact Analysis because the latter included estimates of indirect costs that EPA had previously assessed qualitatively. Pet'rs' Opening Br. 43. That argument misunderstands the logical outgrowth standard.

Because "the very premise of agencies' duty to solicit, consider, and respond appropriately to comments is that rules evolve from conception to completion[,]" this court does not require that a final rule avoid any material change from the notice of proposed rulemaking. *Brennan*, 45 F.4th at 69; *see id.* ("[T]he APA does not require that rules be subjected to multiple cycles of notice and comment until the version adopted as final is identical to the last notice of proposed rulemaking[.]"); *Connecticut Light & Power Co. v. Nuclear Regul. Comm'n*, 673 F.2d 525, 533 (D.C. Cir. 1982) ("The agency need not renotice changes that follow logically from or that reasonably develop the rules it proposed originally. Otherwise, the comment period would be a perpetual exercise rather than a genuine interchange resulting in improved rules.").

As with any final rule that has adapted in response to critical public comments, then, there were changes between the Economic Assessment and the Regulatory Impact Analysis. As Petitioners point out, the Economic Assessment performed a qualitative assessment that included more high-level cost-benefit considerations such as whether "harness[ing] the efficiency and expertise of the private sector" in shifting the costs of cleanup to polluters rather than the government would result in lower costs than the current baseline, given that PFOA and PFOS had been designated as pollutants or contaminants at select Superfund sites. J.A. 144.

That does not mean that Petitioners lacked notice that EPA might perform a quantitative analysis in the final rule. Notably, the Economic Assessment's qualitative analysis included quantitative cost estimates as well. EPA cited a 2019 study on the "historical average" cost of remedial actions at sites on the National Priorities List, estimating that range to be "between $35.2 and $48.2 million per site." J.A. 149. And further, recognizing the "lack of information and systemic analysis of remediation of PFOS and PFOA" specifically, EPA explicitly sought "information and comment that may allow EPA to estimate incremental indirect costs associated with this rule." J.A. 148.

That EPA made changes between the quantitative estimates in the Economic Assessment and the Regulatory Impact Analysis is proof that notice and comment rulemaking is working as it should. The whole point of this kind of rulemaking is for the agency to learn, adapt, and change its proposed action in response to public input if warranted. *Brennan*, 45 F.4th at 69.

Further, so long as an agency has "expressly asked for comments on a particular issue or otherwise made clear that the agency was contemplating a particular change[,]" the APA notice requirement has been met. *Brennan*, 45 F.4th at 69. That is the case here. Petitioner the Chamber of Commerce and others submitted comments calling on EPA to conduct a Regulatory Impact Analysis. J.A. 212, 326, 339. The Chamber of Commerce also submitted a detailed cost-benefit analysis, including its own models for a quantitative cost calculation of impacts on private parties, to be included in that Regulatory Impact Analysis. *See* J.A. 212–220.

Other commentators similarly propounded direct and indirect costs not identified in the Economic Assessment for EPA to address in formulating a final rule. *See, e.g.*, J.A. 242–243 (identifying categories of costs "left unaddressed in the economic assessment" relating to possible "over-adjustment" in PFAS treatment by companies seeking to avoid CERCLA liability); J.A. 285 (estimating increased annual costs of "PFAS management" for municipal solid waste landfills); J.A. 340 (estimating increased costs to the solid waste sector); J.A. 364–365 (urging EPA to increase its upper-bound estimate of direct costs).

EPA heeded those demands and included additional cost estimations and a more detailed cost-benefit analysis in the Regulatory Impact Analysis. *See* J.A. 525–595. In response to the Chamber of Commerce's Coalition of Companies and Trade Associations' comments that the Economic Assessment's $370,000 estimate for an upper-bound cost of annual notifications was "simply not representative" of the true cost, J.A. 365, EPA increased its upper-bound estimation of those costs to $1,630,000, J.A. 528–529. In response to that same party's comments that EPA's qualitative approach to indirect costs was insufficient, *see* J.A. 363, 365, the agency added a quantitative analysis to its consideration of indirect costs, J.A. 534–571.

In this way, the Designation's cost-benefit analysis evolved logically from the notice of proposed rulemaking and Economic Assessment in light of comments submitted by Petitioners and others such that Petitioners "should have anticipated the final rule in light of the notice[.]" *Brennan*, 45 F.4th at 69 (quotation marks omitted). In addition, as long as the agency provides "notice" in its proposed rulemaking that it may elect to proceed with a qualitative rather than quantitative analysis, the agency's "way of proceeding" qualifies as a "'logical outgrowth' of the notice[.]" *Mozilla Corp. v. FCC*, 940 F.3d 1, 70 (D.C. Cir. 2019) (*per curiam*). The same is true for the reverse situation here, where EPA sought comment on whether it should proceed with a quantitative analysis in the final rule, 87 Fed. Reg. at 54,423, and Petitioners proposed that it do just that, *see* J.A. 212–220.

Because the cost-benefit analysis in the Designation and its accompanying Regulatory Impact Analysis logically followed from the notice of proposed rulemaking and incorporated Economic Assessment, the changes made to the final rule and its cost-benefit analysis satisfy the APA's notice requirement.

b

Petitioners next contend that EPA withheld critical information in the form of the "specific methodology, data, and assumptions that EPA used to evaluate cost in the Final Rule." Pet'rs' Opening Br. 46–47.

Petitioners are correct that an agency must share "critical information" upon which a final rule is based and subject it to public comment. *GPA Midstream Ass'n*, 67 F.4th at 1197; *Owner-Operator Indep. Drivers Ass'n v. Federal Motor Carrier Safety Admin.*, 494 F.3d 188, 199 (D.C. Cir. 2007). At the same time, we do not require repeated rounds of notice and comment "when additional fact gathering merely supplements information in the rulemaking record[.]" *Chamber of Commerce of the U.S. v. SEC*, 443 F.3d 890, 900 (D.C. Cir. 2006). Supplementary information "expands on and confirms information" in the notice of proposed rulemaking, "and addresses alleged deficiencies in the pre-existing data[.]" *Id.* (quotation marks omitted).

Supplementation of the cost-benefit analysis is exactly what happened here. Though EPA added some additional data and basic calculations of indirect cost predictions, those additions merely supplemented what had been put forward in the Economic Assessment, which was incorporated as part of the notice of proposed rulemaking.

True, EPA added some additional data and basic calculations of cost probability distributions to its calculations of indirect costs, but that just built on the data and qualitative analyses that EPA had put out for notice and comment. The additional data of which Petitioners complain was added in response to comments and simply "expand[ed] on and confirm[ed]" the data and analysis provided in the Economic Assessment. *Chamber of Commerce*, 443 F.3d at 900 (quoting *Solite Corp. v. EPA*, 952 F.2d 473, 484 (D.C. Cir. 1991) (*per curiam*)).

Take the estimated cleanup costs for sites listed on the National Priorities List, on which Petitioners say they had no opportunity to comment. Pet'rs' Opening Br. 46. The Economic Assessment provided estimates of these costs "for reference[,]" pointing to a 2019 study that calculated the historic average cost of cleanups at these sites to be between $35.2 and $48.2 million per site. J.A. 148–149. That number was not perfect, EPA noted, because those were cleanups of all hazardous substances at a site, and it is possible that cleanup of PFOA and PFOS would not add significantly to the existing cleanup costs of other preexisting hazardous substances at these sites. J.A. 149. The Regulatory Impact Analysis then calculated the estimated increase in cleanup costs after the designation of PFOA and PFOS as hazardous substances to be between $10.3 million and $51.7 million. J.A. 567. That lower end is significantly lower than that in the 2019 study, but that follows from EPA's explanation in the Economic Assessment that, where cleanup efforts are already ongoing, the marginal increase in cost to add two additional hazardous substances would often not significantly add to the cleanup costs. *See* J.A. 149. And the Regulatory Impact Analysis's upper-bound estimation of $51.7 million is just a hair's breadth away from the 2019 study's upper-bound of $48.2 million, after accounting for inflation over the intervening five years.

Nor could it have been a surprise to Petitioners that the cleanup costs at sites not on the National Priorities List were estimated to be significantly lower than the cleanup costs at sites on the List. *Compare* J.A. 546, *with* J.A. 567. As EPA explained in the notice of proposed rulemaking, the sites on the National Priorities List are considered "among the worst hazardous substance sites" in the country, 87 Fed. Reg. at 54,420, which almost always renders cleanups at those sites larger undertakings with higher price tags.

Petitioners also take issue with the Regulatory Impact Analysis's "calculation of quantified benefits" at sites on the National Priorities List, complaining that they "had no chance to address" this calculation. Pet'rs' Opening Br. 46. But because of difficulties in estimating the exact monetary value of benefits to human health and the environment, EPA did not tally up a total "benefit" amount, relying instead on "illustrative" examples of some benefits, including cleaner well water and higher property values near impacted sites. *See* J.A. 579–584. These new data points are just case studies and illustrations of the benefits previewed in the Economic Assessment. *See* J.A. 144–147. The data, drawn in part from studies put forward by commenters, *see* J.A. 242 & n.7; J.A. 584 & n.301, serve simply to "confirm" the qualitative assessment of these benefits previously put forward. J.A. 694, 696 (emphasis omitted). A new round of notice and comment for confirmatory material is not required. *See Owner-Operator*, 494 F.3d at 201 ("[A]n agency does not violate the APA if its methodology remains constant and new data is merely used to check or confirm prior assessments.") (formatting modified). That is especially appropriate here, where Petitioners are challenging a cost-benefit analysis that responded to their own comments that EPA should have used a more quantitative approach. *See* J.A. 212–213, 361, 363. They cannot be prejudiced by getting what they asked for.

Petitioners rely on *Owner-Operator Independent Drivers Association v. Federal Motor Carrier Safety Administration*, 494 F.3d 188 (D.C. Cir. 2007), to argue that even when an agency makes only *one* change to its cost-benefit analysis, it must go through another round of notice and comment, *id.* at 200–201; Pet'rs' Opening Br. 44, 46.

Owner-Operator imposed no such categorical rule. In that case, the Federal Motor Carrier Safety Administration promulgated a final rule regulating the hours a commercial vehicle driver could work without resting. 494 F.3d at 195–196. That rule relied on a novel cubic curve that was first presented in the Regulatory Impact Analysis. *Id.* at 200. This "entirely new" methodology of graphing, which "derived [from] a regression equation," was "a central component of the justification" for the final rule. *Id.* at 199–201. Notably, the new cubic curve was how the agency had justified increasing the daily driving hours from ten hours to eleven hours. *See id.* at 200–202. While prior studies in the record based on a national database of crash statistics supported a ten-hour driving limit, the new cubic curve "substantially" shrunk the estimated crashes related to fatigue between hours ten to eleven. *Id.* at 200. Because of the new methodology's centrality to the change in regulation, we held that it was "not a minor modification used to check or confirm prior analyses" or to supplement data, but instead was "central" to the agency's decision. *Id.* at 201.

Nothing so novel or unforeseeable happened in the Designation's Regulatory Impact Analysis. EPA employed no novel methodology to reach a materially new or different conclusion. Instead, the final rule simply used corroborating data to confirm quantitatively its prior qualitative analysis after receiving comments from Petitioners and others urging it to perform just such a quantitative analysis. *See Owner-Operator*, 494 F.3d at 201 ("[A]n agency does not violate the APA if its methodology remains constant and new data is merely used to check or confirm prior assessments.") (formatting modified).

2

Petitioners separately argue that EPA's cost-benefit analysis was arbitrary and capricious because, in their view, EPA (1) miscalculated cleanup costs at sites on the National Priorities List, (2) miscalculated costs at sites off of the National Priorities List, (3) ignored cleanup costs at federal sites, (4) disregarded the impact on certain industries, (5) incorrectly assessed benefits, and (6) failed to consider the impact of the Designation on small businesses. *See* Pet'rs' Opening Br. 50–65. Petitioners are mistaken on all six fronts.

a

Petitioners voice a number of complaints with EPA's estimation of cleanup costs at National Priorities List sites.

To start, they object to EPA assuming that it was already expending costs to clean up PFOA and PFOS at these sites as pollutants or contaminants. Pet'rs' Opening Br. 50. According to Petitioners, EPA failed to show that it was cleaning up PFOA and PFOS at these sites or that it even had the statutory power to clean up these substances as pollutants or contaminants.

Petitioners have their facts wrong. EPA noted in the final rule: "EPA has already identified and treated PFOA and PFOS as pollutants and contaminants at multiple Superfund sites, including the Saint-Gobain Performance Plastics facility in Hoosick Falls, New York, and the Blades Groundwater site in Blades, Delaware." *Designation*, 89 Fed. Reg. at 39,173. So it was reasonable for EPA, given its on-point experience, to consider only the marginal costs beyond what was already incurred for cleanup of PFOA and PFOS as pollutants or contaminants.

Next, Petitioners assert that the Designation "warps EPA's incentives" because it "encourages EPA to clean up sites it might deem too expensive to clean up itself by allowing EPA to recover those costs from others." Pet'rs' Opening Br. 51.

The Designation does not create an incentive problem—it solves one. The Designation shifts the burden to the very private parties that deposit hazardous substances at the site, rather than allowing those parties to spread these two forever chemicals and expect taxpayers to clean up after them. That is the core purpose of CERCLA: "to promote the timely cleanup of hazardous waste sites and to ensure that the costs of such cleanup efforts [are] borne by those responsible for the contamination." *Atlantic Richfield Co.*, 140 S. Ct. at 1345 (quoting *CTS Corp.*, 573 U.S. at 4) (alteration in original).

Petitioners also challenge the reasonableness of EPA's estimation of increased cleanup costs at sites that contain other hazardous substances in addition to PFOA and PFOS. Pet'rs' Opening Br. 52–53. In estimating those costs, EPA "ma[de] the conservative assumption that there [would be] a cost premium"—that is, a marginal increase in costs for PFOA and PFOS cleanups beyond the ongoing efforts. J.A. 553–554. Rather than assuming a single premium, EPA analyzed a range of scenarios, with the cost premium varying from 2% to 10%. J.A. 553–554, 563–565. Petitioner Chamber of Commerce also baked a cost premium into its estimates, but assumed, based in part on "its own research," that the premium could range from 5% to 100%. J.A. 215–216. EPA rejected the high end of those estimates, *see* J.A. 563–565.

This court "do[es] not review EPA's cost figuring *de novo*, but accord[s] EPA discretion to arrive at a cost figure within a broad zone of reasonable estimat[ion.]" *National Wildlife Fed'n v. EPA*, 286 F.3d 554, 563 (D.C. Cir. 2002) (*per curiam*) (quoting *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1049 (D.C. Cir. 1978)). Given "the complex nature of economic analysis typical in the regulation promulgation process, [Petitioners'] burden to show error is high." *Id.*

Petitioners have not met that burden. EPA reasonably explained why it modeled marginal costs as it did. The agency pointed out that, "in many cases[,]" the necessary infrastructure to treat PFOA and PFOS would already be in place at hazardous-waste sites because it is also required to remove and redress other hazardous substances. J.A. 554. In addition, "some of the same treatment technologies for PFOA and PFOS contamination" would "likely be[] applied for other hazardous substances in many cases." J.A. 554. Because of EPA's factfinding that "infrastructure may already be in place" to address PFOA and PFOS at most sites already on the National Priorities List, EPA reasonably concluded that the marginal cost increase of addressing PFOA and PFOS beyond what would already be cleaned up from the list of over 800 existing hazardous substances would be tempered. *See* J.A. 554.

Further, EPA considered and rejected the Chamber of Commerce's data on this point, stating that the study commissioned by the Chamber of Commerce had relied on "discussions with industry rather than empirical data" for developing its probability distributions and had relied on "30-year-old data" for the basis of its cost estimates. J.A. 688, 213. In addition, the study "conflate[d] costs to address PFOA and PFOS contamination" at sites on the National Priorities List "with costs attributable to designating PFOA and PFOS as hazardous substances[,]" overlooking that the PFOA and PFOS often have to be cleaned up anyhow as pollutants or contaminants. J.A. 688. Plus even if EPA adds a site to the National Priorities List, that "does not mean that any remedial or removal action will be taken." J.A. 688.

In short, EPA fairly considered the Chamber of Commerce's proposals and reasonably rejected them based in part on its factfinding and experienced judgment. There is nothing arbitrary or capricious about that. *See National Wildlife Fed'n*, 286 F.3d at 563 ("The court should not undertake its own economic study, but must uphold the regulations if EPA has established in the record a reasonable basis for its decision.") (quotation marks omitted); *Mississippi Comm'n on Env't Quality v. EPA*, 790 F.3d 138, 150 (D.C. Cir. 2015) (*per curiam*) (deferring "to the EPA's evaluation of scientific data within its technical expertise") (quotation marks omitted).

Finally, Petitioners argue that EPA failed to account for the addition of sites to the National Priorities List due to the presence of only PFOA and PFOS and no other hazardous substances. Pet'rs' Opening Br. 52.

EPA considered that argument and drew a different conclusion based on the record before it. It estimated that an average of 10.9 new sites would be investigated for addition to the National Priorities List each year. J.A. 561. EPA then noted that at non-federally owned sites on the National

Priorities List, only 5.5% contained a single hazardous substance, which reduces materially Petitioners' concern about independent costs stemming from PFOA/PFOS-only sites. J.A. 509. EPA's cost analysis also explained that "the establishment of new NPL sites with PFOA/PFOS contamination" would be "limit[ed]" because the national production of these chemicals has "largely been phased out[.]" J.A. 564 n.258. That reasoned review of record evidence and the agency's real-world experience adequately explain why EPA concluded that listing PFOA and PFOS would not dramatically increase its estimate of cleanup costs for the sites (if any) with only PFOA and PFOS contamination. Petitioners' disagreement and desire for a different approach does not render EPA's conclusions arbitrary or capricious.

b

Petitioners next argue that EPA made an arbitrarily low estimate of the cleanup costs at sites not listed on the National Priorities List. Pet'rs' Opening Br. 54. They argue those costs should have been higher because there are so many more contaminated sites than are currently listed and because there may be enforcement actions by entities other than the federal government. *Id.* at 54–55.

The record supports EPA's judgment.

First, EPA reasonably estimated the number of sites not on the National Priorities List where it anticipated pursuing enforcement actions and adequately explained its reasoning. EPA estimated the number of PFOA and PFOS contamination sites based on data tracked by companies that participated in a voluntary Stewardship Program to phase out the manufacture of PFAS more generally. J.A. 541. It then filtered for "sites where the likelihood of PFOA/PFOS contamination is the highest." J.A. 541. That process identified 133 sites that would qualify under EPA's standards for higher levels of contamination. J.A. 541. The agency then assumed that it would pursue enforcement actions at only half of these sites, and those actions would be spread out over time "[d]ue to resource constraints[.]" J.A. 541–542. As a result, EPA calculated costs for enforcement actions at 67 non-National Priorities List sites over a four-year period. J.A. 542.

Petitioners see things differently. They cite a study that EPA had relied on in another part of the Regulatory Impact Analysis that estimated 57,412 sites that likely were contaminated with PFOA and PFOS, making EPA's estimates "far too low[.]" Pet'rs' Opening Br. 55 (citing J.A. 314).

EPA reasonably rejected Petitioners' count of contaminated sites. Their estimate was for sites contaminated with *any* PFAS, which sweeps in "over 9,000 chemicals[,]" J.A. 592, rather than just the two at issue here—PFOA and PFOS.

Given that glaring flaw in Petitioners' numbers, EPA reasonably relied instead on the remedial site investigations of other hazardous substances to reach its estimated 133 qualifying sites. J.A. 542–543. *Contrast* Pet'rs' Opening Br. 56. EPA explained that it selected a low-end and high-end estimate based on that historical data. J.A. 543. That was reasonable given that there is no indication in the record that PFOA and PFOS exposures would be outliers as to frequency compared to the more than 800 already-existing hazardous substances.

Further, Petitioners' argument incorrectly assumes that all contaminated sites are going to face cleanup actions and resulting enforcement actions against responsible parties.

Instead, EPA assumed that it would pursue investigations "at approximately half" of the estimated 133 qualifying sites. J.A. 541. There is little question that funding constraints limit EPA's ability to take enforcement actions. *See* J.A. 542. EPA estimated that "[d]ue to resource constraints," and based on "historical patterns of PFOA/PFOS production and use in the U.S.[,]" it planned to begin enforcement actions at only sixteen to seventeen sites not on the National Priorities List per year. J.A. 541–542.

Petitioners briefly argue that EPA acted arbitrarily and capriciously in "assum[ing]" cleanup would only be initiated by the federal government. Pet'rs' Opening Br. 56. To the contrary, EPA acknowledged that "states may use their own authorities, if available, to require investigations, site characterizations, or further response including cleanup." J.A. 540. EPA then reasonably declined to include a cost estimation for these cleanups in its cost-benefit analysis given the uncertainty over state laws and whether and when States would unilaterally pursue such cleanups. J.A. 540–541. Given that the Designation is a federal regulation interpreting a federal statute and overseen by a federal agency, it was reasonable for EPA to refrain from trying to predict how state laws might or might not affect the independent actions of all 50 States and other jurisdictions.

Lastly, to the extent Petitioners want costs to include indemnification actions by private parties seeking to hold other private parties accountable for the costs of cleanup, they seek to double count expenses because EPA already accounted for that indemnification cost when it allocated cleanup costs to the original polluter. The mere shifting of costs from one private party to another does not create an additional set of costs.

c

Petitioners next attack EPA's estimate of cleanup costs at federal facilities. They argue that the agency put too much stock into voluntary actions by the federal government that EPA assumed would be undertaken even absent the Designation. Pet'rs' Opening Br. 57.

While EPA's analysis was reasonably explained, J.A. 569–572, and based on data from ongoing cleanup efforts by the Department of Defense, *see* J.A. 464–468, 569–572, we also note that any miscalculation in this regard would have no effect on Petitioners. This issue concerns the federal government's expenditure of its own funds to clean up its own sites due to hazardous exposures caused by its own activities. Petitioners nowhere explain how they would be affected, let alone prejudiced, by any calculation errors on this front. *See Prohibition Juice Co. v. United States Food & Drug Admin.*, 45 F.4th 8, 24 (D.C. Cir. 2022); 5 U.S.C. § 706 (requiring reviewing courts to take "due account…of the rule of prejudicial error").

d

Petitioners next take issue with EPA's treatment of costs to certain industries, arguing that EPA ignored the costs of the Designation to the waste management sector, the construction industry, and the recycled materials industry. Pet'rs' Opening Br. 59–63.

EPA, though, acknowledged that industries like waste management and construction historically have used PFOA and PFOS, *see* J.A. 501–502, and spent several paragraphs analyzing possible costs at wastewater treatment plants and landfills that might contain sludge with PFOA and PFOS, *see*

J.A. 502–503. The agency then addressed the concerns expressed in these industries' comments about incurring unlimited third-party liability for PFOA and PFOS contamination of which they were not aware. *See* J.A. 233–235, 330, 339–341; *Designation*, 89 Fed. Reg. at 39,160–39,162. EPA reiterated CERCLA's limitations on liability, including for "situations in which the release or threat of release of a hazardous substance was caused by an act of God, an act of war, or an act or omission of a third party[,]" and for entities that add only a "de minimis" or "de micromis" amount to a release. *Designation*, 89 Fed Reg. at 39,169; *see id.* at 39,175, 39,179–180, 39,183. EPA also noted that the law already requires certain reporting requirements for waste management companies handling toxic chemicals, 42 U.S.C. § 11023; 40 C.F.R. pt. 372). *Designation*, 89 Fed Reg. at 39,175.

In that way, EPA reasonably grappled with Petitioners' concerns. Reasoned decisionmaking does not require EPA to undertake a deep-dive, individualized cost-benefit analysis of indirect impacts for every single potentially affected industry. *See Cigar Ass'n of America v. FDA*, 5 F.4th 68, 76 (D.C. Cir. 2021) ("[A]ppellants cite no authority for the proposition that FDA needed to consider the benefits of premarket review specifically for each industry or product affected by the [final] Rule.").

e

Moving on from cost calculations, Petitioners challenge EPA's calculation of the benefits of listing PFOA and PFOS as hazardous substances. Pet'rs' Opening Br. 53, 64.

Petitioners' central objection is that EPA treated certain costs as benefits by considering CERCLA's shifting of costs from taxpayers to private industry to be a benefit, rather than recognizing that those costs will be imposed on private industry. Pet'rs' Opening Br. 64.

We reject Petitioners' characterization. EPA's Regulatory Impact Analysis and the Designation did not reclassify costs as benefits. Rather, EPA "recognize[d] that designation will result in economic costs borne by PRPs [private parties]" and "acknowledge[d] that the costs parties expend to clean up PFOA and PFOS is a burden for them." *Designation*, 89 Fed. Reg. at 39,164. EPA then explained that these costs would otherwise be borne by taxpayers, and that the transfer of these costs from taxpayers to polluting companies was an "advantage" of the Designation. *Id.*; *see also id.* at 39,152; J.A. 551–552. Transferring costs, EPA reasoned, would free up Superfund dollars to address sites that EPA otherwise could not address, resulting in benefits to the public. *Designation*, 89 Fed. Reg. at 39,153; J.A. 534, 547. EPA reasonably determined that placing the burden of cleanup on "those responsible for significant contamination represents an improvement in social welfare as a result of the rule." *Designation*, 89 Fed. Reg. at 39,152. EPA's reasoning is consistent with CERCLA's objectives to promote "timely cleanup" and "ensure that the costs of such cleanup efforts [are] borne by those responsible for the contamination." *Atlantic Richfield Co.*, 140 S. Ct. at 1345 (quotation marks omitted). In sum, EPA acknowledged the private sector's costs, but it also reasonably concluded that the transfer of costs from taxpayers to polluters was an advantage of the Designation. That approach was not arbitrary and capricious.

Petitioners also suggest that EPA must "consider whether the purported health benefits of cleaning up PFOA and PFOS could be obtained through less costly means." Pet'rs' Opening Br. 64. Petitioners propose "providing alternative water" to populations whose water sources are contaminated with PFOA and PFOS. *Id.*

Some alternative solutions are so patently unadministrable that EPA need not directly address them. *See Farmers Union Cent. Exch., Inc. v. FERC*, 734 F.2d 1486, 1511 n.54 (D.C. Cir. 1984) ("Agency action 'cannot be found wanting simply because the agency failed to include every alternative device and thought conceivable by the mind of man * * * regardless of how uncommon or unknown that alternative may have been.'") (quoting *Vermont Yankee Nuclear Power Corp. v. NRDC, Inc.*, 435 U.S. 519, 551 (1978)). Providing bottled water and bringing in and perpetually refilling water tanks for every single person in scores of communities for decades—or however much longer these two forever chemicals remain—fails the common-sense test. Nor does that proposal address the distinct environmental harms from the continuing presence of PFOA and PFOS.

f

Petitioners' final arbitrary and capricious argument is that EPA violated the Regulatory Flexibility Act by excluding indirect costs from its accounting of the Designation's impact on small businesses. Pet'rs' Opening Br. 65–66. That argument fares no better than its predecessors.

The Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996, 5 U.S.C. § 601 *et seq.*, "is intended to evoke commentary from small businesses about the effect of the rule on their activities, and to require agencies to consider the effect of a regulation on those entities." *Cement Kiln Recycling Coal. v. EPA*, 255 F.3d 855, 868 (D.C. Cir. 2001) (*per curiam*). At the same time, an agency need not undertake a lengthy analysis "if it certifies 'that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.'" *Id.* (quoting 5 U.S.C. § 605(b)).

Petitioners do not challenge EPA's calculation of direct costs for small businesses, but argue instead that EPA failed to consider indirect costs associated with the Designation, such as potential future liability for cleanup actions, which they argue would constitute "the lion's share of costs[.]" Pet'rs' Opening Br. 66.

The Regulatory Flexibility Act, however, does not extend to indirect effects on small businesses, at least where, as here, those effects are contingent on multiple intervening and uncertain events. *See Cement Kiln*, 255 F.3d at 869 ("[T]his court has consistently rejected the contention that the RFA applies to small businesses indirectly affected by the regulation of other entities."); *Mid-Tex Elec. Co-op., Inc. v. FERC*, 773 F.2d 327, 343 (D.C. Cir. 1985) ("Congress did not intend to require that every agency consider every indirect effect that any regulation might have on small businesses in any stratum of the national economy.").

By its terms, the Regulatory Flexibility Act requires agencies to consider "the projected reporting, recordkeeping and other compliance requirements of the rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record[.]" 5 U.S.C. § 604(a)(5).

Those requirements capture the direct reporting requirements that EPA evaluated, *Designation*, 89 Fed. Reg. at 39,184–39,185; J.A. 421, but do not extend to Petitioners' perceived downstream risk of liability, which depends upon multiple intervening decisions, analyses, reviews, and opportunities for public input. *See* Section III.C., *infra*. That leaves several more opportunities for EPA to consider site investigation and cleanup costs borne by small businesses if and when those costs arise. *See* 42 U.S.C. § 9605(a) (requiring notice and comment rulemaking, which triggers a Regulatory Flexibility Act analysis, 5 U.S.C. § 604(a), for sites to be added to the National Priorities List, after which those sites may face remedial action); *see also* 42 U.S.C. § 9605(a)(7) (requiring that EPA develop "means of assuring that remedial action measures are cost-effective"); 40 C.F.R. § 300.430(e)(7)(iii), (9)(iii) (requiring the consideration of cost-effective alternatives for remedial actions).

C

Petitioners separately claim that the Designation is arbitrary and capricious because EPA assertedly did not "carefully assess[] and does not understand" the "severe consequences" this Designation will have. Pet'rs' Opening Br. 67. According to Petitioners, "[t]hese uncertainties included (1) where PFOA and PFOS are located, and in what quantities; (2) what economic costs the Final Rule will impose, and how parties will address contamination; and (3) unintended consequences of designation, including on real estate transactions." *Id.* at 67–68.

EPA fully acknowledged that uncertainties exist in regulating PFOA and PFOS as hazardous substances. *See, e.g.*, *Designation*, 89 Fed. Reg. at 39,129 ("Every site is unique and the extent of action necessary to mitigate risks depends on many factors, which leads to uncertainties regarding response activities and associated costs."); *id.* at 39,150 ("[T]here is considerable uncertainty regarding the cost of health burdens that may result from exposure to PFOA or PFOS, and associated cost savings from reducing the incidence of these burdens because of designation."); *id.* ("[T]here remains uncertainty concerning the location and number of sites that will be identified as needing remediation and the extent of contamination at those sites. There is also uncertainty regarding the potential incremental increase in cost (if any) of addressing PFOA or PFOS at a site along with other [Contaminants of Concern] present."); *id.* at 39,159 ("EPA assessed potential disadvantages of designation and weighed those against the advantages. The disadvantages include * * * the potential for uncertainty.").

As EPA explained in the Designation, the central reason that these uncertainties exist at the initial designation stage is that "CERCLA response actions are discretionary, contingent, and site-specific determinations." *Designation*, 89 Fed. Reg. at 39,149–39,150; *see also id.* at 39,169 n.65 ("EPA * * * only responds to those releases that pose unacceptable risk to human health and the environment. Even then, EPA may assess relative risk among releases to determine which releases should be prioritized for investigation and, potentially, clean up."). As a consequence, numerous additional regulatory steps must occur before any liability ever attaches to a responsible party.

1

Consider, for example, the case of a new site that requires remedial action. "[R]emedial action" involves a complex and lengthy cleanup process for sites that pose particularly serious risks to human health and the environment. 42 U.S.C. § 9601(24); J.A. 447–448.

Because EPA conducts remedial actions only at sites listed on the National Priorities List (absent limited circumstances, such as a special agreement with the polluting party, which would require a willing counterparty and the negotiation of party- and site-specific terms), *see* J.A. 448 & n.81, EPA must first proceed through that extensive listing process. And that is just the beginning of the contingent steps before any responsible party might receive a bill for cleanup costs.

For a site even to be considered for the National Priorities List, it has to:

> (1) score above a certain threshold on CERCLA's Hazard Ranking System, which "assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review[,]" 42 U.S.C. § 9605(c)(1); 40 C.F.R. § 300.425(c)(1);
>
> (2) be designated by a State "as its highest priority" site for cleanup, 40 C.F.R. § 300.425(c)(2); or
>
> (3) be both:
>
> > (a) categorized by EPA as "pos[ing] a significant threat to public health" and as a site for which remedial action "will be more cost-effective" than a removal action, and
> >
> > (b) the subject of a "health advisory" issued by the Agency for Toxic Substances and Disease Registry, *id.* § 300.425(c)(3).

Because of those factors, site placement on the National Priorities List is never certain. EPA reported that it has placed on the List "only about 3 percent of the 53,400 sites assessed since the program's beginning in 1980." *Designation*, 89 Fed. Reg. at 39,138.

And even when EPA decides to place a site on the List, it must go through notice and comment rulemaking, which itself could derail a proposed listing. 42 U.S.C. § 9605(a)(8)(A); *see also Eagle-Picher Indus., Inc. v. EPA*, 759 F.2d 905, 910 (D.C. Cir. 1985) (describing the listing process).

Those few sites that make it to the National Priorities List must then undergo a remedial site evaluation, as required by the National Contingency Plan. *See* 42 U.S.C. § 9607(a) (limiting liability to removal and remedial actions "not inconsistent with the national contingency plan"); 40 C.F.R. § 300.420 (listing requirements for remedial site evaluations).

There is still more. Even if the site satisfies the conditions of the National Contingency Plan, EPA must then develop a remedial action plan. *See* 40 C.F.R. §§ 300.430, 300.435. As part of that process, EPA is required to compare alternative options for cleanup and to assess costs, including direct and indirect capital costs, annual operation and maintenance costs, and the net present value of the costs. *Id.* § 300.430(e)(9)(iii). CERCLA explicitly mandates that EPA "assur[e] that remedial action measures are cost-effective[.]" 42 U.S.C. § 9605(a)(7).

EPA must then undertake a second notice and comment period to approve its proposed remedial plan. *See* 42 U.S.C. § 9617(a).

Only after all that will questions of liability for a responsible party arise, 42 U.S.C. § 9607, and even then, financial costs may be allocated among multiple responsible parties, *see Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599, 614–615 (2009) (explaining how joint-and-several liability and apportionment apply to CERCLA tortfeasors).

2

As an alternative to the listing and remedial action route, EPA might conclude that a removal action is called for. Unlike a remedial action, a removal action is a quicker "emergency response[]" stopgap measure for smaller-scale chemical releases. J.A. 447; *see* 42 U.S.C. § 9601(23). Though removal actions are generally shorter term and less costly than remedial actions, EPA still must go through several regulatory steps before questions of liability arise.

First, the National Contingency Plan requires EPA to determine that "there is a threat to public health or welfare of the United States or the environment" before it can undertake a removal action. 40 C.F.R. § 300.415(b)(1).

To determine whether there is such a threat, EPA must consider a list of seven non-exhaustive factors including actual or potential "exposure to nearby human populations," "contamination of drinking water supplies[,]" "[w]eather conditions[,]" "[t]hreat of fire or explosion[,]" and "[t]he availability of other appropriate federal or state response mechanisms to respond to the release[.]" 40 C.F.R. § 300.415(b)(2).

Then, if EPA determines that an extensive removal action is needed—that is, an action requiring six months or more of planning—additional regulatory steps kick in. 40 C.F.R. § 300.415(n)(4). They include the publication of notice "in a major local newspaper of general circulation" and an opportunity for public comment thereafter. *Id.* § 300.415(n)(4)(ii), (iii). EPA also must conduct "an engineering evaluation/cost analysis" of the proposed action. *Id.* § 300.415(b)(4)(i).

3

Finally, for both removal and remedial actions, there are additional statutory layers of protection before a responsible party faces liability.

First, a party has to qualify as a "[c]overed person[]" under 42 U.S.C. § 9607, which limits liability to those who (1) owned or operated a facility with one or more hazardous substances at the time of release or cleanup, or (2) arranged for, conducted, or owned a vehicle used for the transportation or disposal of the hazardous substance. 42 U.S.C. § 9607(a); *see also Burlington N. & Santa Fe Ry. Co.*, 556 U.S. at 610 ("[T]he question whether § 9607(a)(3) liability attaches [based on the "[c]overed person[]" designation] is fact intensive and case specific, [and] such liability may not extend beyond the limits of the statute itself.").

Second, CERCLA provides complete defenses to liability when a release was caused by "an act of God" or "an act or omission of a third party[,]" so long as the defendant has "exercised due care" and taken "precautions against foreseeable" risks. 42 U.S.C. § 9607(b).

Third, the government must show that all costs imposed on the polluter are "not inconsistent with the national contingency plan[,]" 42 U.S.C. § 9607(a), an extensive series of regulations that includes mandatory considerations of cost efficiency, *see* 40 C.F.R. pt. 300; *see also, e.g.*, *id.* § 300.415(b)(4) (requiring the creation of "an engineering evaluation/cost analysis"); *id.* § 300.425(c)(3)(iii) (requiring that "EPA anticipate[] that it will be more cost-effective to use its remedial authority than to use removal"); *id.* § 300.430(e)(7)(iii) (requiring a feasibility study that includes "[t]he costs of construction and any long-term costs" of alternatives).

Fourth, CERCLA directs EPA to "minimize litigation" and prioritize settlements over enforcement actions. 42 U.S.C. § 9622(a). CERCLA provides that, "[w]henever practicable and in the public interest," EPA must pursue settlement with a responsible party. *Id.* Any settlement agreements also must be "in the public interest and consistent with the National Contingency Plan[.]" *Id.*

* * * * *

All of those uncertainties and contingencies make forecasting liability costs exceptionally difficult upfront. But those same steps also ensure that remedial and recovery actions are undertaken only upon thoroughgoing site-specific consideration and review by EPA, a weighing of the relative harms and benefits of action, and consideration of the statutory limitations on liability. Given all that, Petitioners' worry that listing PFOA and PFOS as hazardous substances will lead ineluctably to significant liability is misplaced.

Further, EPA explained that the Designation's impact on regulated parties can be mitigated, at least in part, by EPA's enforcement discretion and CERCLA's explicit liability limitations. *See Designation*, 89 Fed. Reg. at 39,129–39,130, 39,138–39,139, 39,169 (citing 42 U.S.C. § 9607(a), (b)). In addition to CERCLA's limitations on liability, EPA cited several "de minimis" and "de micromis" protections for polluters who contributed small amounts to a much larger release, *id.* at 39,160–38,161 (citing 42 U.S.C. § 9607(o)), including an expedited settlement process, *id.* at 39,130 n.17 (citing 42 U.S.C. § 9622(g)(1)).

EPA's discussion of liability limitations also disposes of Petitioners' complaint that EPA failed to consider uncertain costs associated with real estate transactions. EPA did not conduct an individualized cost analysis of the Designation's impact on the real estate market. But EPA is not required to "respond to every comment, or to analyze every issue or alternative raised by the comments[.]" *Sherley v. Sebelius*, 689 F.3d 776, 784 (D.C. Cir. 2012) (formatting modified). Because EPA discussed more generally the limitations on liability for those who are not primarily responsible for a release, *see Designation*, 89 Fed. Reg. at 39,139, as well as "innocent landowners" that are protected from liability if they have "no knowledge of the contamination at the time of purchase," *id.* at 39,161 (citing 42 U.S.C. § 9601(35)), which would include individuals who purchase a home polluted by a prior owner, EPA adequately addressed that concern.

Indeed, few if any exercises of regulatory enforcement discretion are roped around with so many required layers of analysis, protections, and limitations. Experience bears that out. PFOA and PFOS are two drops in a bucket of the over 800 hazardous substances under CERCLA, 40 C.F.R. § 302.4 table, including hundreds that have been on the list since CERCLA was enacted in 1980. *See, e.g.*, Air Pollution Prevention and Control List of Hazardous Air Pollutants, 36 Fed. Reg. 5,931, 5,931 (March 31, 1971) (designating asbestos, beryllium, and mercury as hazardous air pollutants under Section 112 of the Clean Air Act, which is incorporated by CERCLA's list of designated hazardous substances, 42 U.S.C. § 9601(14)); Designation of Hazardous Substances, 43 Fed. Reg. 10,474, 10,481–10,486 (March 13, 1978) (same for acetic acid, ammonia, arsenic disulfide, butyric acid, calcium cyanide, chlorine, ferric sulfate, lead acetate, phosphorus, and hundreds of others as hazardous substances under Section 311(b)(2)(A) of the Federal Water Pollution Control Act). Petitioners have come forward with no evidence that those responsible for the presence of hazardous substances at a site have been unfairly saddled with liability or that the statute's operation has hamstrung industry.

In sum, having adequately considered and reasonably explained its decision to regulate at this initial stage even in the face of acknowledged uncertainties, EPA made a reasoned decision on the record before it in designating the forever chemicals PFOA and PFOS as hazardous substances.

IV

For the foregoing reasons, the petitions for review are denied.

So ordered.