WILL RISK AVERSION AT THE NRC AVERT THE ENERGY TRANSITION?

by Kyle Danish, Adam Stein, and Paul Libus

Kyle Danish is a Partner at Van Ness Feldman, LLP. Adam Stein is Director of the Nuclear Energy Innovation Program at the Breakthrough Institute. Paul Libus is an Associate at Van Ness Feldman.

SUMMARY

The Nuclear Regulatory Commission (NRC) and the U.S. Environmental Protection Agency (EPA) both have long-standing risk regulation regimes. To promote deployment of advanced nuclear reactors, Congress directed the NRC to reform its licensing regulations to increase the use of risk-informed, performance-based, and technology-neutral approaches. However, the NRC has doubled down on its traditional risk-management strategies, which require eliminating even the most remote and improbable risks, and which fail to account for the benefits of advanced reactors. This stringency is in sharp contrast to the way EPA regulates facilities that emit hazardous air pollutants under Clean Air Act §112. This Article argues that EPA's §112 regulations provide a point of comparison and a potential road map for the NRC to use in meeting the mandate for reform. It demonstrates that the NRC has substantial headroom to reform its regulations while preserving an ample margin of safety for the public. In addition, the NRC can draw lessons from EPA in developing technology-inclusive and risk-informed policies.

Over time, federal agencies have increasingly integrated quantitative risk assessments into their development of public health and environmental regulatory standards for industrial activities. Such assessments have substantial implications for public welfare. Under-regulation can expose millions of Americans to excessive health, safety, and environmental risks. Over-regulation can unduly burden innovation and the economy, and in some cases can constrain economic activities that are themselves crucial to public health, safety, and the environment.

The Nuclear Regulatory Commission (NRC) and the U.S. Environmental Protection Agency (EPA) are two agencies with established risk regulation regimes. As with other agencies, their risk regulation regimes have some common elements, but also some different metrics.

Today, the NRC's risk regime is under heightened scrutiny. A major expansion of nuclear energy—particularly from new, advanced reactors—is a centerpiece of the U.S. strategy to decarbonize the economy. The U.S. Congress has passed a suite of laws aimed at promoting the build-out of advanced reactors. These new laws include a directive to the NRC to reform its licensing regulations to increase the use of risk-informed, performance-based, and technology-neutral approaches. Congress has sent a strong message that the NRC's current highly risk-averse approach is incompatible with the imperative of achieving a near-zero energy sector within a few decades.

However, the NRC's initial efforts suggest an inclination to double down on the approaches that it applies to the large-scale light-water reactors currently in operation. These approaches condition license approvals on an applicant's elimination of even the most remote and improbable risks, and they fail to account for the potential public benefits of nuclear energy.

The NRC is fixated on a particular conceptualization of risk regulation. There is no question that operating any new nuclear power facility—even an advanced reactor—introduces risks. And the public has a substantial interest in ensuring that any reactor is designed to manage these risks appropriately. However, the NRC seems to believe that Congress has charged it with nullifying even the most remote risk without regard to other factors—including the human health, environmental, and climate benefits of

Authors' Note: This Article does not necessarily represent the views of Van Ness Feldman, LLP, or its clients. The authors would like to thank William Boyd, Jeffrey Merrifield, Sam Kalen, and Jonathan Wiener for their input and insights. All errors and omissions are the authors' own.

advanced reactors relative to other forms of electricity generation. The NRC's conservatism presents a barrier to the transition to a decarbonized energy sector.

The extreme restrictiveness of the NRC risk regulation regime is thrown into sharp relief through a comparison with the way EPA regulates hazardous air pollutants (HAPs) under §112 of the Clean Air Act (CAA).[1] The comparison is not just academic. Congress gave the agencies overlapping regulatory authority over cancer-causing radionuclide emissions from nuclear reactors, but set EPA's §112 regulations as the yardstick against which to evaluate the sufficiency of the NRC's regulatory regime. When EPA analyzed NRC-regulated facilities in 1995, it found that the radionuclide dose level from reactors was at least an order of magnitude below what EPA would have allowed under its highly conservative, congressionally codified risk assessment and management methodology.

To be sure, there is no uniform method for federal agencies to use in managing risk. Each federal agency has adopted its own set of standards, and agencies may use metrics that are not directly comparable. For example, as discussed below, one of the major metrics utilized by the NRC is the quantitative health objectives (QHOs), which set an upper limit on the annual probability of causing a cancer, whereas the "residual risk" technology standard used by EPA applies on a 70-year, "lifetime" basis. Some metrics assess risks resulting from the normal operation of facilities, whereas others are specific to accident scenarios.

Although metrics used by different agencies do not always have direct comparability, indirect comparisons can still provide valuable insight into an agency's relative risk tolerance. To that end, EPA's §112 regulations provide both a point of comparison and a potential model to reform the NRC's regulatory regime for nuclear reactors in response to congressional mandates.

Part I of this Article describes recent congressional directives to the NRC to reform its licensing regulations to promote the development and deployment of advanced nuclear reactors—including a mandate for the NRC to reform its risk-related regulations. Part II provides an introduction to quantitative risk assessment and risk management as implemented by different federal agencies. Part III provides an overview of the NRC's risk regulation regime, including the NRC staff's proposed regulations for advanced nuclear reactors. Part IV provides an overview of EPA's §112 risk regulation regime. Part V compares the two regimes. Part VI offers conclusions from this comparative analysis.

I. The Congressional Mandate to Reform NRC Licensing Regulations for Advanced Reactors

Traditionally, the United States has held nuclear power in an uneasy embrace. In recent years, however, there has been growing bipartisan support in the executive and legislative branches for policies that promote the development and deployment of nuclear energy as a centerpiece of domestic and global decarbonization strategies. John Kerry, the Joseph Biden Administration's international climate envoy, has stated, "The United States is now committed to trying to accelerate the deployment of nuclear energy. It's what we believe we absolutely need in order to win this battle."[2] During the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28), the United States joined more than 20 countries in launching a declaration to triple nuclear energy capacity by 2050.[3]

A primary focus of federal nuclear energy policy is a new category of reactors, known as advanced nuclear reactors. The COP28 declaration recognizes that these new technologies can "occupy a small land footprint and can be sited where needed, partner well with renewable energy sources, and have additional flexibilities that support decarbonization beyond the power sector, including hard-to-abate industrial sectors."[4]

The Energy Act of 2020 defines "advanced nuclear reactor" to include a fission reactor "with significant improvements compared to reactors operating on the date of enactment" or a fusion reactor.[5] Examples of fission reactor improvements identified by the Act include (1) additional inherent safety features; (2) lower waste yields; (3) improved fuel and material performance; (4) increased tolerance to loss of fuel cooling; (5) enhanced reliability or improved resilience; (6) increased proliferation resistance; (7) increased thermal efficiency; (8) reduced consumption of cooling water and other environmental impacts; (9) the ability to integrate into electric applications and nonelectric applications; (10) modular sizes to allow for deployment that corresponds with the demand for electricity or process heat; and (11) operational flexibility to respond to changes in demand for electricity or process heat and to complement integration with intermittent renewable energy or energy storage.[6]

The statutory definition of "advanced nuclear reactor" covers a wide range of technologies.[7] However, there is particularly strong interest in "small modular reactors" (SMRs), which the International Atomic Energy Agency classifies as reactors that have an electric generation capacity of 300 megawatts or less.[8] Relative to the large-scale

1. 42 U.S.C. §§7401-7671q, ELR Stat. CAA §§101-618.

2. Brad Plumer & Ivan Penn, *U.S. Bets on Small Nuclear Reactors to Help Fix a Huge Climate Problem*, N.Y. Times (Nov. 12, 2023), https://www.nytimes.com/interactive/2023/11/12/climate/nuclear-reactors-clean-energy.html.
3. Press Release, U.S. Department of Energy, At COP28, Countries Launch Declaration to Triple Nuclear Energy Capacity by 2050, Recognizing the Key Role of Nuclear Energy in Reaching Net Zero (Dec. 1, 2023), https://www.energy.gov/articles/cop28-countries-launch-declaration-triple-nuclear-energy-capacity-2050-recognizing-key.
4. *Id.*
5. Pub. L. No. 116-260, div. Z, §2002, 134 Stat. 2418, 2459 (2020) (amending the definition of "advanced nuclear reactor" in the Energy Policy Act of 2005 at 42 U.S.C. §16271(b)(1)).
6. *Id.*
7. *See generally* Congressional Research Service, Advanced Nuclear Reactors: Technology Overview and Current Issues (2023).
8. Joanne Liou, *What Are Small Modular Reactors (SMRs)?*, Int'l Atomic Energy Agency (Sept. 13, 2023), https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs.

light-water reactors in operation today, SMRs promise lower financing costs and the potential for large-scale factory production. SMRs could also fit more easily within the footprint of industrial operations, providing not only carbon-free electricity, but also carbon-free heat.[9]

Both Republican and Democratic administrations and legislators have thrown substantial support behind advanced reactors as a mass-producible source of carbon-free energy. Congress has committed billions to fund the construction of advanced reactor technology demonstration projects, fuel availability programs, and programs to reduce project risk.[10] The 2022 Inflation Reduction Act established a range of new tax credits to incentivize the deployment of advanced reactors.[11]

In January 2019, Congress passed the Nuclear Energy Innovation and Modernization Act (NEIMA), which garnered nearly unanimous and bipartisan support.[12] NEIMA reflects Congress' judgment that the emerging U.S. advanced reactor sector needs not only federal funding support, but also a reformed NRC licensing process. NEIMA requires the NRC to develop "regulatory processes necessary to allow innovation and the commercialization of advanced nuclear reactors."

Specifically, NEIMA directs the NRC to develop, within two years of enactment, "strategies for the increased use of *risk-informed*, *performance-based* licensing evaluation techniques and guidance" for advanced reactors.[13] By 2027, the NRC is required to transform these techniques into a technology-inclusive regulatory framework that developers of advanced reactors may use in lieu of the current framework for conventional reactors.[14] NEIMA's legislative history shows that Congress intended the law's "risk-informed, performance-based" approach as a necessary departure from business as usual at the NRC.[15]

Yet, the NRC's initial steps to meet NEIMA mandates are far from encouraging. In March 2023, NRC staff published a draft proposed rule intended to comply with NEIMA, known as the Proposed Part 53 Rule.[16] NEIMA had called for simplified rules that would set requirements but not mandate the method that the applicant had to use to meet them. But the Proposed Part 53 Rule is even more cumbersome than current regulations and is more than 1,000 pages long. One major issue with the draft rule is that the staff has proposed codifying as additional risk-limiting requirements concepts that previously have been the subject of nonbinding guidance, several of which are discussed in this Article.

II. Quantitative Risk Assessment by Federal Agencies

According to the National Research Council, "[r]isk assessment has become a dominant public-policy tool for information risk managers and the public about the different options for protecting public health and the environment."[17] For federal regulatory agencies such as the NRC and EPA, risk assessment, and particularly quantitative risk assessment, has become instrumental for "evaluating public-health concerns, informing regulatory and technologic decisions, setting priorities for research and funding, and developing approaches for cost-benefit analyses."[18]

Such assessments can guide decisions by regulators in screening, priority setting, and, ultimately, in the promulgation of regulatory standards.[19] Priority setting and standard setting fall under the rubric of "risk management."[20] The federal government does not have uniform, standardized guidelines for risk assessment, nor are there uniform criteria for how much risk is too much risk.[21] However, the advent of quantitative risk assessment has resulted in numerical standards that allow for a certain degree of comparative analysis among agencies.

One category of risk assessment evaluates incidents or accidents that could have severely adverse consequences. A

9. For a comprehensive introduction to and evaluation of advanced reactors, see Adam Stein et al., Breakthrough Institute, Advancing Nuclear Energy: Evaluating Deployment, Investment, and Impact in America's Clean Energy Future (2022), https://thebreakthrough.org/articles/advancing-nuclear-energy-report.
10. *See, e.g.*, Pub. L. No. 116-260, div. Z, §2003, 134 Stat. 2418, 2459-70 (2020); Press Release, U.S. Department of Energy, U.S. Department of Energy Announces $160 Million in First Awards Under Advanced Reactor Demonstration Program (Oct. 13, 2020), https://www.energy.gov/ne/articles/us-department-energy-announces-160-million-first-awards-under-advanced-reactor; Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, §41002, 135 Stat. 429, 1127 (2021); CHIPS and Science Act, Pub. L. No. 117-167, §§10744, 10781, 136 Stat 1366, 1720, 1728 (2022).
11. *See* Kathryn Huff, *Inflation Reduction Act Keeps Momentum Building for Nuclear Power*, U.S. Dep't Energy (Sept. 8, 2022), https://www.energy.gov/ne/articles/inflation-reduction-act-keeps-momentum-building-nuclear-power.
12. Pub. L. No. 115-439, 132 Stat. 5565 (2019) (codified at 42 U.S.C. §2215 (note)).
13. NEIMA §103(a)(2), 132 Stat. at 5571-72 (emphasis added).
14. *Id.* §103(a)(4), 132 Stat. at 5572. *See also id.* §3(14), 132 Stat. at 5567 (defining "technology-inclusive regulatory framework" to mean "a regulatory framework developed using methods of evaluation that are flexible and practicable for application to a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods").
15. Press Release, U.S. Senate Committee on Environment and Public Works, Senate Passes Bipartisan Nuclear Energy Legislation (Dec. 20, 2018), https://www.epw.senate.gov/public/index.cfm/2018/12/senate-passes-bipartisan-nuclear-energy-legislation. *See also* S. Rep. No. 115-86, at 5 (2017), *available at* https://www.congress.gov/115/crpt/srpt86/CRPT-115srpt86.pdf (the "regulatory framework has evolved to oversee light water reactor technologies and may not be suitable for advanced technologies with unique characteristics that may warrant different safety requirements").
16. *See* NRC, SECY-23-0021: Proposed Rule: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors (RIN 3150-AK31) (Mar. 1, 2023), ADAMS Accession No. ML21162A093 [hereinafter Proposed Part 53 Rule].
17. National Research Council, Science and Decisions: Advancing Risk Assessment, at ix (2009). *See also* William Boyd, *Genealogies of Risk: Searching for Safety, 1930s-1970s*, 39 Ecology L.Q. 895, 897 (2012):
> Risk thinking is everywhere. Health and environmental threats, social deviance and criminality, financial crises, terrorism, emerging diseases, the fate of the planet: all of these (and many more) are now to a very considerable degree conceived, assessed, and managed as risk—a concept that emerged in the early modern period, but one that has taken on its contemporary, increasingly formal usage only in the last century.
18. National Research Council, *supra* note 17, at ix.
19. *Id.*
20. *Id.*
21. *Id.* at 273.

prominent methodology for such assessments is "probabilistic risk assessment" (PRA). A PRA quantifies the probability of certain types of accidents at a facility and the magnitude of their consequences for the environment and public health and welfare.[22] Another type of risk assessment focuses on qualitative and quantitative indications of the human health risks attributable to exposure to an environmental agent.[23]

In 1983, the National Research Council published a risk assessment guide known as the "Red Book," which is widely cited and relied upon by federal agencies for assessing the risks to the public from chemicals or other agents emitted or released by a regulated facility or activity.[24] The Red Book identifies four steps in such an assessment. The first step is hazard identification, which involves a threshold analysis of whether the agent increases a person's risk of adverse health effects (e.g., cancer). The second step is dose-response evaluation, which is an evaluation of how the probability of adverse effects changes with the level of exposure to the agent. The third step is exposure assessment, which is a determination of the extent of human exposure to the agent before or after application of regulatory controls. The fourth step is risk characterization, which is a description of the nature and magnitude of human risk, including attendant uncertainty.[25]

The third step in this process, exposure assessment, is a determination of just how much exposure to a health-compromising agent a population will actually confront. Agencies use at least two different parameters for exposure assessment. One parameter looks at risk across the entire population, also known as "incidence" or "population risk."[26] A second parameter assesses the risk to individuals who suffer the largest incremental risk from the exposure—sometimes referred to as the maximum individual risk (MIR).[27] An agency often estimates the MIR by identifying a hypothetical person living closest to the relevant facility: the maximum exposed individual (MEI). The agency then will model that person's exposure based on assumptions that this individual is outdoors breathing the air at the fenceline of the facility 24 hours a day for 70 years.[28] Alon Rosenthal et al. observe that the approach is purposefully conservative:

> Although no one spends his or her entire life outdoors at the fenceline of the factory, and although few factories produce the same products, or even exist, for seventy years, the MEI calculation is designed to be conservative. By overstating probable actual exposure, it provides a safety margin, giving an upper bound on the true lifetime exposure.[29]

When an agency has three data points—the identified hazardous agent, an estimate of the relationship between doses of the agent and health responses, and estimates of exposure (i.e., dose) from the relevant activities or facilities—it can calculate a numerical risk estimate.[30] This risk characterization estimate can be expressed in terms of the increased annual or lifetime probability of an adverse health effect from a particular level of dose (e.g., excess lifetime cancer risks).

What the agency does with this numerical risk characterization may depend on its mandate from Congress. Statutes typically have narrative, rather than numerical, tests for priority setting and standard setting. Rosenthal et al. identify three types of narrative statutes guiding EPA's management of risk:

(1) those that compel EPA to clean up the environment to the degree that is technologically achievable (often called "technology-based" statutes);

(2) those that compel EPA to clean up the environment to a degree that makes sense based on a balancing of health benefits and the costs of control (so-called "balancing" statutes); and

(3) those that compel EPA to clean up the environment to a degree that assures that the public health is protected, usually with some margin of safety (so-called "health-based" statutes).[31]

Rosenthal et al. also observe that, in some cases, Congress has used more than one of these forms in a single statute.[32] As discussed below, CAA §112 is an example of such a hybrid. Further, although §112 started as a purely narrative mandate, Congress subsequently added a numerical standard for priority setting.

The use of quantitative risk assessment as a public policy tool is subject to various critiques. A 2009 National Research Council report explains that risk assessment is "at a crossroads," and facing "credibility challenges."[33] The report states: "The science of risk assessment is increasingly complex; improved analytic techniques have produced more data that lead to questions about how to address issues of, for example, multiple chemical exposures, multiple risks, and susceptibility in populations."[34]

22. NRC, *Probabilistic Risk Assessment (PRA)*, https://www.nrc.gov/about-nrc/regulatory/risk-informed/pra.html (last updated July 7, 2020).
23. Alon Rosenthal et al., *Legislative Acceptable Cancer Risk From Exposure to Toxic Chemicals*, 19 Ecology L.Q. 269, 270 (1992).
24. National Research Council, Risk Assessment in the Federal Government: Managing the Process (1983) ("Red Book").
25. *Id.* at 3.
26. Rosenthal et al., *supra* note 23, at 290.
27. *Id.*
28. *Id.* at 291.
29. *Id.*
30. *Id.* at 294.
31. *Id.* at 296 (citations omitted).
32. *Id.*
33. National Research Council, *supra* note 17, at 3.
34. *Id.*

III. Key Elements of the NRC's Approach to Risk Regulation

The Atomic Energy Act of 1954 as amended (AEA) is the foundational authority for federal regulation of risks to the public from nuclear energy and other uses of nuclear materials.[35] The first clause of the AEA is a declaration that the development of atomic energy is in the national interest:

> Atomic energy is capable of application for peaceful as well as military purposes. It is therefore declared to be the policy of the United States that—
>
> (a) the development, use, and control of atomic energy shall be directed so as to make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security; and
>
> (b) the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.[36]

Consistent with these findings, the AEA directed the predecessor to the NRC—the Atomic Energy Commission—to establish regulations "necessary in order to enable it to find that the utilization or production of special nuclear material will be in accord with the common defense and security and will *provide adequate protection to the health and safety of the public*."[37] The NRC inherited this mandate.[38]

As with other "narrative" risk management mandates, the AEA does not define what constitutes "adequate protection" to public health and safety. Over time, the NRC has interpreted this mandate by promulgating regulations and issuing guidance.[39]

In 1986, the NRC issued a "Safety Goal Policy Statement," which the Commission has used to guide its evaluation of individual reactor designs.[40] The safety goals, which are summarized in Table 1 below, fall into two categories. One category relates to "latent cancer risks," which are cancers that develop over time because of the operation of a plant over its full lifetime. The second category relates to "prompt fatality risks," which are immediate or near-immediate deaths after an accident at the plant involving a release of radiation into the environment.

A. Regulating Latent Cancer Risks

The qualitative goals provide that the public should experience "no significant additional risk to life and health" from the construction and operation of a nuclear reactor.[41] The quantitative objectives are intended to quantify this qualitative objective.[42] In the case of latent cancer risk, the quantitative objective is that radionuclide emissions from a new nuclear plant should not increase the risk of cancer-related fatalities by more than 0.1% for the population living within 10 miles of the plant—an MEI metric.[43]

Applying this 0.1% factor to the annual cancer fatality rate in the United States, which is approximately one in 500, the NRC derived a QHO of limiting cancer cases from the plant to no more than two in one million per year.[44] Put another way, the latent cancer QHO requires that the risk of excess fatal cancers for the maximally exposed population should be no more than two in one million for each year of reactor operation.

In elaborating the latent cancer risk QHO, NRC staff pivoted from determining a risk limit based on the risks from other like activities (i.e., alternative forms of energy generation) to a risk limit derived from particular health objectives (i.e., the existing prevalence of all cancer-related fatalities).[45] Aside from the numerical stringency of the limits, this approach presents a number of challenges. First, the latent cancer metric is not observable in the population within the vicinity of a nuclear reactor with scientific confidence.[46] Second, there is significant uncertainty for many of the inputs to the calculation.[47]

To facilitate evaluation of individual license applications, the NRC established "subsidiary" (also referred to as "surrogate") objectives.[48] These metrics are technology- and practice-specific and therefore more concrete and certain for applicants, but can take years for the NRC to develop. Some subsidiary objectives (large early release) were defined in the original 1986 Safety Goal Policy Statement.[49] Other subsidiary objectives (core damage frequency) were approved by the Commission in June 2000,[50] more than 13 years after the Commission issued its initial policy.

35. 42 U.S.C. §2232(a).
36. *Id.* §2011.
37. *Id.* §2232(a) (emphasis added).
38. *Id.* §5841(a)(1), (f).
39. The Proposed Part 53 Rule asserts that "compliance with NRC regulations and guidance may be presumed to assure adequate protection at a minimum." Proposed Part 53 Rule, *supra* note 16, at 33.
40. Safety Goals for the Operation of Nuclear Power Plants: Policy Statement; Correction and Republication, 51 Fed. Reg. 30028 (Aug. 21, 1986) [hereinafter Safety Goal Policy Statement].
41. *Id.*
42. *Id.*
43. *See id.* at 30030-31.
44. 2 NRC, Feasibility Study for a Risk-Informed and Performance-Based Regulatory Structure for Future Plant Licensing D-4 (2007) (NUREG-1860).
45. *See* NRC, Safety Goals for Nuclear Power Plant Operation 29-33 (rev.1 1983) (NUREG-0880) [hereinafter Safety Goals for Nuclear Power Plant Operation].
46. *See* Adam Stein, Breakthrough Institute, Quantitative Health Objectives in a Performance-Based Regulation 3 (2022), ADAMS Accession No. ML22038A112.
47. In the past, the NRC had the position that using QHOs instead of surrogate metrics may be possible in principle, but would introduce additional uncertainty and would require additional consideration. *See* NRC, Regulatory Guide 1.174, An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis 5 (rev.3 2018), ADAMS Accession No. ML17317A256.
48. *See id.*
49. Safety Goal Policy Statement, *supra* note 40, at 30031.
50. *See* NRC, SRM-SECY-00-0077: Modifications to the Reactor Safety Goal Policy Statement (Mar. 30, 2000), ADAMS Accession No. ML003727206.

In its Proposed Part 53 Rule, the Commission staff has also adopted a concept from the existing regulations requiring each new design to achieve doses of radiation that are "as low as reasonably achievable" (ALARA).[51] The draft language requires that "[a] combination of design features and programmatic controls must, to the extent practical, be based upon sound radiation protection principles to achieve occupational doses that are as low as is reasonably achievable . . . ."[52] The proposal neither identifies specific designs nor a numerical threshold that would satisfy this ALARA requirement.

B. Regulating Risks From an Accident

In addition to establishing QHOs for latent cancer risks from long-term exposure, the NRC also has established QHOs for the risk of "prompt fatality" from an accident at a reactor.[53] The derived "prompt fatality" QHO provides that the risk of early fatality for an individual living within one mile of the site boundary should not exceed five in 10 million per year. This is 1,000 times smaller than the average risk of fatality due to all types of accidents in the United States, which is approximately five in 10,000 per year.[54]

C. Consideration of Competing Technologies

One of the NRC's safety goals involves the consideration of alternative forms of electricity generation: "Societal risks to life and health from nuclear power plant operation should be comparable to or less than the risks of generating electricity by viable competing technologies and should not be a significant addition to other societal risks."[55] One way to advance this goal would be for the NRC to compare the risk resulting from approving an application to the risk resulting from denial. The latter would involve calculating the risks attributable to the alternative technology that would supply the same demand for energy. Throughout most of the country, the alternative would be a fossil fuel-fired power plant operating on a near constant, "baseload" basis.[56]

Such an analysis could show an overall risk reduction from approving applications for new advanced reactors relative to denying them. In practice, however, the NRC does not do this kind of analysis.[57]

D. The NRC Staff's Proposed Part 53 Rule

The NRC staff's current proposal for a Part 53 rule for advanced reactors largely doubles down on the stringency of the framework in place for conventional, light-water reactors. The draft outlines two pathways for licensing: Framework A and Framework B.[58] Notably, Framework A codifies the QHO goals as regulatory requirements.[59] The current draft text of the Framework A rule establishes QHO-based safety requirements for each license application and requires the applicant to demonstrate compliance through a complex PRA.[60]

Framework B, on the other hand, is more similar to the existing licensing frameworks for conventional reactors.[61] It uses deterministic, technology- or practice-specific requirements to demonstrate safety.[62] To address "prompt fatality" risks, Framework B backstops the requirements with a PRA requirement, but also offers applicants a PRA alternative referred to as the alternative evaluation for risk insights (AERI) methodology.[63] The AERI methodology adopts very conservative assumptions.[64] The methodology assumes that, in every year of its operational life, the plant experiences a worst-case accident (referred to as a "bounding event"), after which it is rebuilt and then resumes operation—presumably with the approval of the NRC.[65] The AERI methodology sets a cumulative radiation lifetime dose limit that the licensee must demonstrate that it can meet under these assumptions.[66]

Table 1 (next page) summarizes the risk standards.

IV. Key Elements of EPA's Risk Regulation Regime for Major Sources of HAPs

A. HAPs

When Congress enacted the CAA in 1970, it established a uniquely stringent regulatory regime in §112 for certain air pollutants deemed to pose a significant threat to public health and the environment, even when present in very

51. Proposed Part 53 Rule, *supra* note 16, at 38, 280.
52. *Id.* at 955-56 (Framework B §53.4730(a)(3)).
53. *See* Safety Goal Policy Statement, *supra* note 40, at 30028.
54. *See* Safety Goals for Nuclear Power Plant Operation, *supra* note 45, at 30.
55. *Id.* at 11, 25.
56. A comparison to a wind or solar resource would be inapt because such resources only provide intermittent generation. Therefore, such resources would not be likely substitutes for a denied reactor.
57. Congress has recently demonstrated a strong interest in this kind of analysis. Under the National Environmental Policy Act of 1969 (NEPA), an agency must undertake an environmental impact statement (EIS) of any agency action—including the permitting or approval of a new facility—that could have a significant impact on the environment. An EIS must incorporate an analysis of alternatives to the proposed action, including an analysis of a scenario in which there is no action by the agency. In the Fiscal Responsibility Act of 2023, Congress amended NEPA to require that this "no action" analysis include an "analysis of any negative environmental impacts of not implementing the proposed agency action." Pub. L. No. 118-5, 137 Stat. 10 (2023) (amending §102(2) of NEPA (42 U.S.C. §4332(2))).
58. *See* Proposed Part 53 Rule, *supra* note 16, at 4.
59. *See id.* at 279.
60. *See id.* at 5.
61. *See id.* at 4.
62. *See id.* at 18.
63. *See id.* at 11.
64. *See* Charlyne Smith et al., Breakthrough Institute, Flaws With the Alternative Evaluation of Risk Insights (AERI) (2023), https://thebreakthrough.imgix.net/AERI-whitepaper-2.pdf.
65. *See id.*
66. The NRC assumes a "lifetime dose" to be the dose resulting from a 96-hour (four-day) early-phase exposure and a 50-year late-phase exposure. *See* NRC, Advisory Committee on Reactor Safeguards Radiological Rulemaking Policies and Procedures Part 53 Subcommittee 620 (2022), ADAMS Accession No. ML22299A184; *see* NRC, Draft Regulatory Guide DG-1414, Alternative Evaluation for Risk Insights (AERI) Methodology 8 (2022), ADAMS Accession No. ML22272A045.

Table 1. Summary of NRC Risk Standards and Objectives

	Prompt Fatality Risks	Latent Cancer Risks
Qualitative safety goals[a]	Individual members of the public should be provided a level of protection from the consequences of nuclear power plant operation such that individuals bear no significant additional risk to life and health.	Societal risks to life and health from nuclear power plant operation should be comparable to or less than the risks of generating electricity by viable competing technologies and should not be a significant addition to other societal risks.
Quantitative risk objectives[b]	The risk to an average individual in the vicinity of a nuclear power plant of prompt fatalities that might result from reactor accidents should not exceed 0.1% of the sum of prompt fatality risks resulting from other accidents to which members of the U.S. population are generally exposed.	The risk to the population in the area near a nuclear power plant of cancer fatalities that might result from nuclear power plant operation should not exceed 0.1% of the sum of cancer fatality risks resulting from all other causes.
Derived QHOs[c]	The risk of early fatality for an individual living within one mile of the site boundary should not exceed five in 10 million per year (based on average risk of fatality due to all types of accidents of approximately five in 10,000 per year in the United States).	The annual risk of latent cancer fatality to an individual living within 10 miles of a nuclear power plant should not exceed two in one million per year (based on an overall average risk of latent cancer fatality of approximately 2,000 in one million per year in the United States).
Subsidiary objectives[d]	The frequency of a large, early release should not exceed 10 in one million per year (limiting the potential for an accident that could result in early fatalities).	The frequency of core damage should not exceed 100 in one million per year (limiting the potential for an accident that could affect the population over a longer period of time).

a. Safety Goals for the Operation of Nuclear Power Plants: Policy Statement; Correction and Republication, 51 Fed. Reg. 30028, 30030 (Aug. 21, 1986).
b. *Id.*
c. See NRC, Safety Goals for Nuclear Power Plant Operation 29-33 (rev.1 1983) (NUREG-0880).
d. See NRC, SRM-SECY-00-0077: Modifications to the Reactor Safety Goal Policy Statement (Mar. 30, 2000), ADAMS Accession No. ML003727206; NRC, SECY-00-0077: Modifications to the Reactor Safety Goal Policy Statement 9-10 (Apr. 20, 2000), ADAMS Accession No. ML003684288 (addressing large early release).

small quantities.[67] In 1990, Congress amended CAA §112 to add a list of 189 of these HAPs. Radionuclide emissions from nuclear reactors are among these listed HAPs. The amendments also directed the EPA Administrator to modify the list as needed by adding substances:

> which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to, substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic) or adverse environmental effects whether through ambient concentrations, bioaccumulation, deposition, or otherwise.[68]

HAPs are considered "the most dangerous air pollutants emitted from major sources"[69] and are "regarded as extremely dangerous to human health."[70]

1. Evolution of the "Ample Margin of Safety" Standard

☐ *EPA's rulemaking history*. The original, 1970 version of CAA §112 required EPA to list all HAPs and, for each listed HAP, to establish an emission limit at a level that provides for "an ample margin of safety to protect public health."[71] The "ample margin of safety" standard created an immediate interpretive dilemma. Certain toxic pollut-

67. 42 U.S.C. §7412.
68. *Id.* §7412(b)(2) (directing EPA to regulate additional substances fitting these criteria under the national emission standards for hazardous air pollutants (NESHAP) program).
69. American Lung Ass'n v. Environmental Prot. Agency, 985 F.3d 914, 932, 51 ELR 20009 (D.C. Cir. 2021), *rev'd & remanded on other grounds*, 142 S. Ct. 2587 (2022), *order on remand*, No. 19-1140, 2022 WL 15163000 (D.C. Cir. Oct. 27, 2022).
70. United States v. Tzavah Urb. Renewal Corp., 696 F. Supp. 1013, 1021, 19 ELR 20351 (D.N.J. 1988).
71. 42 U.S.C. §7412(b)(1)(B) (1982).

ants have at least some adverse impacts on public health at any level of emissions above zero. EPA acknowledged that, for these "non-threshold pollutants," a narrow interpretation of the congressional "ample margin of safety" mandate would require the Agency to eliminate emissions of the pollutant, which could result in the closure of entire industries.[72] EPA determined that achieving such a level of emission reductions would shut down all nuclear power plants, coal-fired power plants, petroleum refineries, and a large proportion of the chemicals sector.[73]

The Agency reasoned that Congress could not have intended this result, and determined that "the cost of such closure would be grossly disproportionate to the benefits of removing the risk that would remain after imposition of the best available control technology."[74] EPA reached this conclusion even though Congress did not explicitly include a directive to consider cost—and Congress notably did not include a directive in §112 to ensure that certain industrial activities "make the maximum contribution to the general welfare," as the AEA does with respect to nuclear energy. Nonetheless, EPA implemented §112 in a manner that considered costs and technological feasibility.

Certain groups challenged EPA's interpretation in the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit. In its so-called *Vinyl Chloride* decision,[75] the D.C. Circuit agreed with EPA's conclusion that congressional silence on costs and technological feasibility did not preclude the Agency's consideration of such factors. The court went further in outlining a phased methodology for EPA to use in setting emission limits.

Under this methodology, the court first required EPA to make an initial determination of what is "safe" based exclusively upon the determination of the risk to health at a particular emission level—without consideration of costs and technological feasibility.[76] The court pointed out, however, that "safe" does not mean "risk-free"; rather, the Agency was required to determine what level of risk is "acceptable."[77] Second, after determining "safe" levels of exposure, the court held that EPA may decide to impose more stringent standards in order to provide an "ample margin of safety" to the public.[78] During this stage, EPA may weigh cost and technological feasibility factors to account for the inherent limitations of risk assessment, and the limited scientific knowledge of the effects of exposure to pollutants at various levels.[79]

Following the D.C. Circuit's decision, EPA promulgated rules elaborating this two-stage regulatory approach in the context of addressing emissions of benzene from several types of industrial activities—referred to as the benzene national emissions standard for hazardous air pollutants (Benzene NESHAP).[80] Congress subsequently amended §112 to codify the two-stage approach used by EPA for the Benzene NESHAP as the method for regulation of sources of toxic air pollutants.[81] In doing so, Congress chose to directly clarify prior intent on this matter instead of remaining silent and relying on the *Vinyl Chloride* decision.

The amended §112 requires EPA to adopt technology-based standards in the first instance. Specifically, §112 directs the Agency to determine the "maximum achievable control technology" (MACT) for each category of major sources that emit one or more of the listed HAPs.[82] Under this approach, standards for new sources may not be less stringent than "the emission control that is achieved in practice by the best-controlled similar source."[83]

For a first-of-a-kind facility, EPA develops the MACT through the evaluation of a similar facility. For existing sources, the emission standards may not be less stringent than "the average emission limitation achieved by the best performing 12 percent of the existing sources."[84] After setting this "floor," EPA may require an even greater reduction in emissions, taking into account costs, health effects, environmental effects, and energy requirements.[85] In addition, §112 commands EPA to "review, and revise as necessary" the technology-based standards at least every eight years, in light of technological developments.[86]

Notably, while MACT standards are "technology-based," they are technology-neutral. In setting a MACT standard, EPA identifies a level of control of HAP emissions achieved by the best-performing source. Often, this emissions control is achieved through a particular emissions control technology. However, the MACT standard is a performance standard; it is a numerical limit on emissions and not an order to use any particular technology to meet that limit. EPA has recently observed that "[t]he statutory requirement [in §112] that sources obtain levels of emission limitation that have actually been achieved by

72. National Emission Standards for Hazardous Air Pollutants, 40 Fed. Reg. 59532, 59534 (Dec. 24, 1975) (proposing HAP standard for vinyl chloride).
73. *See* Patricia Ross McCubbin, *Amending the Clean Air Act to Establish Democratic Legitimacy for the Residual Risk Program*, 22 Va. Env't L.J. 1, 8 (2003) (citing National Emission Standards for Hazardous Air Pollutants; Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer, 44 Fed. Reg. 58642, 58660 (Oct. 10, 1979)).
74. National Emission Standards for Hazardous Air Pollutants, 40 Fed. Reg. at 59534.
75. Natural Res. Def. Council, Inc. v. Environmental Prot. Agency, 824 F.2d 1146, 17 ELR 21032 (D.C. Cir. 1987) (en banc).
76. *Id.* at 1164.
77. *Id.*
78. *Id.* at 1165.
79. *Id.*
80. National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Maleic Anhydride Plants, Ethylbenzene/Styrene Plants, Benzene Storage Vessels, Benzene Equipment Leaks, and Coke By-Product Recovery Plants, 54 Fed. Reg. 38044 (Sept. 14, 1989) [hereinafter Benzene NESHAP].
81. *See* 42 U.S.C. §7412(f)(2)(B).
82. *Id.* §7412(d)(2)-(3). The Act defines "major source" as
> any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants.

Id. §7412(a)(1).
83. *Id.* §7412(d)(3).
84. *Id.* §7412(d)(3)(A).
85. *Id.* §7412(d)(2).
86. *Id.* §7412(d)(6).

existing sources, instead of levels that could theoretically be achieved, inherently reflects a built-in cost consideration."[87]

After this technology-based second stage of regulation, EPA must review any residual health risks that have not been eliminated by the initial technology-based standards.[88] This so-called residual risk review is based on calculating the additional lifetime risk of cancer caused by exposure to HAP emissions from a source category after application of the MACT standard.[89] In other words, the "residual risk" stage acts as a health-based safety net to ensure the sufficiency of the technology-based MACT standard.[90]

The EPA "residual risk" methodology generally provides that the "ample margin of safety" standard is met when (1) the maximum individual lifetime cancer risk (i.e., the MIR) for as many people as possible is no greater than one in one million; and (2) no person faces a MIR greater than 100 in one million.[91] In this case, the MIR is the estimated lifetime risk of contracting cancer that a person living near a regulated source—typically within 50 kilometers—would have if the individual (the MEI) were exposed to the maximum pollutant concentrations for 24 hours per day for 70 years.[92]

If EPA finds that the post-control cancer risk exceeds these metrics, it must reevaluate the MACT standard. However, it is not required to reset the MACT to achieve these particular numerical benchmarks, nor does it require facilities not meeting these metrics to close. Rather, as EPA has recently explained, the Benzene NESHAP approach incorporates a "rebuttable presumption" that any cancer risk greater than 100 in one million to the MEI is unacceptable.

As risks increase above that benchmark, they become presumptively less acceptable, and EPA weighs them with other health risk measures and information in making an overall judgment.[93] Conversely, risk at or below the 100-in-one-million benchmark is presumptively acceptable. The determination of what represents an "acceptable" risk is based on a judgment of "what risks are acceptable in the world in which we live."[94]

Indeed, in a number of cases, EPA has affirmed a new or revised MACT standard based on a level of MIR above the 100-in-one-million threshold. In the Benzene NESHAP rulemaking itself, for example, EPA accepted a MIR of 200 in one million.[95] And the Agency subsequently has accepted a MIR of 200 in one million for other categories of facilities.[96]

In the instances in which EPA has accepted a higher MIR, the Agency has emphasized that relatively few individuals would be exposed to MIRs greater than 100 in one million.[97] EPA also considered the feasibility of other safety controls to reduce risk further,[98] the cost of achieving the next most effective level of control,[99] the degree of uncertainty associated with risk estimates,[100] and various other indicators of risk. This holistic approach allows EPA to identify the "ample margin of safety" based on multiple factors rather than setting a single numerical threshold.

☐ *Legislative history*. As noted above, Congress has affirmed EPA's interpretation of "ample margin of safety" from the Benzene NESHAP rule. Indeed, the legislative history of the 1990 amendments to §112 tells an important story for the present analysis.

In the late 1980s, when Congress initiated efforts to make comprehensive amendments to the CAA, its priority for §112 was acceleration.[101] The original statutory structure for regulation of HAPs, which seemed to require EPA to establish a numerical standard for each HAP, had led to agency paralysis. Between 1970 and 1990, the Agency had promulgated standards for only eight HAPs.[102]

However, Congress was aware of the *Vinyl Chloride* decision and EPA's subsequent Benzene NESHAP rulemaking.[103] The Benzene NESHAP illustrated a potential path forward by shifting to an approach that relied, in the first instance, on technology-based standards for categories of facilities, which EPA could develop more quickly than pollutant-specific standards based on health effects. At the same time, EPA could "backstop" these technology-based standards with a quantitative risk assessment (i.e., the residual risk mechanism). In its amendments to the §112 HAP provisions, Congress adopted, with little controversy, the technology-based first stage of the Benzene NESHAP methodology (i.e., what is known as the MACT standard).

However, both the U.S. Senate and the U.S. House of Representatives wrestled with how to construct the residual risk backstop. Initially, both chambers considered stringent, bright-line approaches. The major Senate bill would

87. National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units—Revocation of the 2020 Reconsideration, and Affirmation of the Appropriate and Necessary Supplemental Finding; Notice of Proposed Rulemaking, 87 Fed. Reg. 7624, 7633 n.23 (Feb. 9, 2022) (citing 5 A Legislative History of the Clean Air Act Amendments of 1990, at 8508-09 (1993)).
88. 42 U.S.C. §7412(f).
89. *Id.* §7412(f)(2)(A).
90. McCubbin, *supra* note 73, at 48.
91. Benzene NESHAP, *supra* note 80, at 38044-45.
92. *See id.* at 38045.
93. *Id.*
94. *See* U.S. EPA, CAA Section 112 Risk and Technology Reviews: Statutory Authority and Methodology 4, Docket No. EPA-HQ-OAR-2020-0505-0026 (Dec. 14, 2017) (citation omitted).
95. Benzene NESHAP, *supra* note 80, at 38047.
96. *See, e.g.*, National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing Residual Risk and Technology Review, 85 Fed. Reg. 49084, 49094 (Aug. 12, 2020); National Emission Standards for Coke Oven Batteries, 70 Fed. Reg. 19992, 19993 (Apr. 15, 2005); National Perchloroethylene Air Emissions Standards for Dry Cleaning Facilities, 71 Fed. Reg. 42724, 42731 (July 27, 2006).
97. National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing Residual Risk and Technology Review, 85 Fed. Reg. at 49102.
98. *Id.*
99. Benzene NESHAP, *supra* note 80, at 38047.
100. National Emission Standards for Coke Oven Batteries, 70 Fed. Reg. at 19993-94.
101. *See* Leslie Sue Ritts & Ben Snowden, *The Regulation of Hazardous Air Pollutants*, *in* The Clean Air Act Handbook 249, 261 (Julie R. Domike & Alec C. Zacaroli eds., 4th ed. 2016); McCubbin, *supra* note 73, at 32 (characterizing the 1990 amendments to §112 as "an attempt to dramatically increase the speed of the EPA's standard-setting for hazardous air pollutants").
102. Ritts & Snowden, *supra* note 101, at 251.
103. *See* McCubbin, *supra* note 73, at 37-38.

have amended §112 to require EPA to promulgate standards that would eliminate any cancer risks to the MEI in excess of one in one million.[104] It would have also established an interim standard of 100 in one million; sources failing to meet the interim standard would be required to close.[105] The original Senate language also prohibited EPA from considering any non-health factors (e.g., cost, cost-effectiveness, technological feasibility, benefits of the regulated activity) when setting emission levels to conform to the bright-line standards.[106]

The major House bill initially adopted a bright-line approach similar to that of the Senate bill, albeit tougher; the House would have set the level at one in one million without an interim step of 100 in one million.[107]

Again, the new first stage of air toxics regulation, the technology-based MACT standard, drew relatively little controversy. The stringent bright-line standards in the initial Senate and House bills, on the other hand, "sparked vociferous controversy," including threats of a Senate filibuster.[108]

Legislators made several revisions to the §112 provisions in the Senate and House bills over the course of amendments to the CAA. Ultimately, the final 1990 amendments to §112—which remain in effect today—adopted the narrative "ample margin of safety" standard for the permissible level of residual risk. The amendments coupled this narrative standard with the one-in-one-million numerical level as a priority-setting device for further health-based regulation rather than as a bright-line regulatory standard. Section 112(f)(2)(A) provides:

> If standards promulgated pursuant to subsection (d) [i.e., MACT standards] and applicable to a category or subcategory of sources emitting a pollutant (or pollutants) classified as a known, probable or possible human carcinogen do not reduce lifetime excess cancer risks to the individual most exposed to emissions from a source in the category or subcategory to less than one in one million, the [EPA] Administrator shall promulgate standards under this subsection for such source category.[109]

In other words, a finding that lifetime cancer risks exceeding the one-in-one-million level triggers a requirement for EPA to promulgate a new or revised regulatory standard ("shall promulgate standards"), but it is not the required regulatory standard itself.[110]

In addition, Congress codified EPA's interpretation of §112 in the Benzene NESHAP: "Nothing in subparagraph (A) or in any other provision of this section shall be construed as affecting, or applying to the [EPA] Administrator's interpretation of this section, as in effect before November 15, 1990, and set forth in the Federal Register of September 14, 1989 (54 Federal Register 38044)."[111]

In 2008, the D.C. Circuit had occasion to interpret the interaction of paragraphs (A) and (B) in the context of a petition for review of an EPA residual risk review for its NESHAP for synthetic organic chemicals.[112] In its final rule, EPA affirmed the existing NESHAP on the grounds that no individual would face an excess lifetime cancer risk of greater than 100 in one million, which EPA regarded as "presumptively acceptable" under its Benzene NESHAP precedents.[113] Environmental petitioners countered that §112(f)(A) mandated the establishment of a regulatory standard ensuring that excess cancer risks would not exceed the level of one in one million.

The D.C. Circuit affirmed EPA's reasoning that paragraph (A) only cites the one-in-one-million threshold as triggering an obligation to "promulgate standards" without specifying the substantive content of those standards.[114] The court also found that the Agency's ultimate determination of the standards was further bolstered by paragraph (B), which cites the Benzene NESHAP as a valid interpretation of §112.[115] The court read the Benzene NESHAP to establish that an "ample margin of safety" was met if as many people as possible faced excess lifetime cancer risks no greater than one in one million—which the court characterized as an "aspirational goal"—and that no person faced risks greater than 100 in one million.[116] The court further held that, by codifying EPA's Benzene NESHAP interpretation of §112, Congress also intended to authorize EPA to consider cost, economic impacts, technological feasibility, and other non-health factors in setting the regulatory standard.[117]

Accordingly, in the 1990 amendments, Congress affirmed the Benzene NESHAP approach as establishing an "ample margin of safety." It considered and rejected

104. S. 816, 101st Cong. §2 (1989) (proposed amendment to CAA §112(f)(1)(B)) (describing the standard as "a standard which eliminates all lifetime risks of carcinogen effects greater than one in one million to the individual in the population who is most exposed to emissions of a pollutant (or stream of pollutants) from a source in the category or subcategory").
105. *Id.* (proposed amendment to CAA §112(f)(1)(A), (i)(1)-(2)).
106. *Id.* (proposed amendment to CAA §112(f)(1)) ("No consideration of cost, cost effectiveness, economic, energy, or other factors or technological feasibility shall be included in the determination of the appropriate level of any emissions standard under this subsection.").
107. H.R. 2528, 101st Cong. §2 (1989) (proposed amendment to CAA §112(g)(2)).
108. *See* Rosenthal et al., *supra* note 23, at 324-25.
109. CAA §112(f)(2)(A).
110. This priority-setting or "triggering" function of the language is described in the conference report accompanying the final amendments. *See* S. Rep. No. 101-952, at 399 (1990) (Conf. Rep.) ("Section 112(f) contains a trigger for standards for non-threshold pollutants . . . .").
111. CAA §112(f)(2)(B).
112. Natural Res. Def. Council v. Environmental Prot. Agency, 529 F.3d 1077, 38 ELR 20137 (D.C. Cir. 2008).
113. National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry, 71 Fed. Reg. 76603 (Dec. 21, 2006).
114. *Natural Res. Def. Council*, 529 F.3d at 1081:
> If Congress had wished to set a "bright line" standard, it would have been rather easy for the draftsmen to say just that. The failure to do so could not have been accidental. In light of the rest of the subsection's language (and other provisions), it seems to us that the subsection was drafted as a deliberately ambiguous compromise.

115. *Id.* at 1082.
116. *Id.*
117. *Id.*

approaches that would have set a more stringent numerical risk threshold. It also considered and rejected approaches that would have made those thresholds actual standards, opting instead to make a residual risk determination only a trigger for further evaluation. Finally, Congress affirmed that in determining the "ample margin of safety," EPA may consider a range of non-health factors related to cost and technological feasibility.

2. Regulating Accidental Releases

Section 112 also has an analog to the NRC's regulations aimed at addressing accidents at a reactor. The requirements for risk management programs (RMPs) are found at CAA §112(r). Congress established §112(r) to prevent catastrophic accidents that can result in releases of toxic pollutants that cause immediate deaths and long-term health consequences for surrounding communities and to mitigate the harm resulting from such accidents. The types of incidents that come within the purview of the §112(r) regime are among the deadliest industrial incidents in U.S. history. In a recently proposed rule to modify and strengthen RMP requirements, EPA cited lessons learned from prior explosions at refineries and chemical plants that led to multiple fatalities.[118]

The accidental release prevention program has three operative elements. First, the statute imposes a "general duty" on owners and operators of all stationary sources producing, processing, handling, or storing any "extremely hazardous substance" to (1) identify hazards that may result from accidental releases; (2) design and maintain a safe facility as necessary to prevent releases; and (3) minimize the consequences of accidental releases that do occur.[119]

Second, the statute requires EPA to "list" substances that, in the case of an accidental release, are known to cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment. For each listed substance, EPA must establish a "threshold quantity" (i.e., the amount of the substance that, if accidentally released, may cause death, injury, or serious adverse effects to human health).[120]

Third, the Act requires owners and operators of facilities containing more than the threshold quantity of a listed substance to develop and implement RMPs to prevent accidental releases and to mitigate the severity of releases that do occur.[121] RMP requirements include conducting a worst-case scenario analysis and a review of accident history, coordinating emergency response procedures with local response organizations, conducting a hazard assessment, documenting a management system, implementing a prevention program and an emergency response program, and submitting a risk management plan to EPA that addresses all aspects of the RMP for all covered processes and chemicals.[122] Facilities must update their RMPs every five years.[123]

V. Comparing the Risk Regulation Regimes

In some respects, the NRC and EPA risk regulation regimes defy a straightforward, apples-to-apples comparison. For example, the two agencies use somewhat different metrics for exposure assessment for the MEI. The NRC's QHO metric assesses the risk of excess cancers on an annualized basis while EPA's metric assesses excess cancers on a lifetime basis. In addition, the two agencies have differing approaches for managing risks associated with accidents. The NRC evaluates reactor designs based on quantitative risk assessments. By contrast, EPA requires risk management plans.

However, as explained below, we have the benefit of a detailed comparative analysis of how each agency manages the risk of excess cancers caused by reactor emissions of radionuclides, which are a listed HAP. This 1995 analysis, mandated by Congress and conducted by EPA, concluded that the NRC's risk regime limits such emissions to a level that is at least an order of magnitude lower than what EPA had determined would meet its "ample margin of safety" standard.

Section A of this part describes the different statutory narrative risk standards established for each agency, and highlights how Congress decided to address the overlapping authority over radionuclide emissions. Section B describes EPA's comparative analysis of the two risk regulation regimes for radionuclides. Section C compares how the two agencies address the issue of technology neutrality and inclusivity. Section D compares the different approaches of the NRC and EPA to accident risk. Section E compares how each agency evaluates the risks attributable to the alternative or substitute for the proposed facility.

A. Congressional Mandates

On their face, the risk regulation directives from Congress to the NRC and to EPA are similarly gnomic. The AEA mandate to set reactor licensing standards that provide "adequate protection to the health and safety of the public" is not obviously distinguishable from the CAA directive to set HAP standards to a level that provides "an ample margin of safety to protect the public health." In particular, there is no evidence that Congress intended that the NRC apply a *more* restrictive and risk-averse approach for licensing new nuclear reactors than EPA should apply for regulating sources of toxic air pollutants.

118. *See, e.g.*, Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Safer Communities by Chemical Accident Prevention, 87 Fed. Reg. 53556, 53589 (Aug. 31, 2022) (describing a catastrophic rupture of a heat exchanger in a Tesoro refinery that fatally injured seven employees).
119. 42 U.S.C. §7412(r)(1).
120. *Id.* §7412(r)(5).
121. *Id.* §7412(r)(7).
122. Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act; Safer Communities by Chemical Accident Prevention, 87 Fed. Reg. at 53562-63.
123. 40 C.F.R. §68.190(b)(1).

However, there is statutory evidence that Congress contemplated that the EPA regime *could be more protective* than the NRC regime in addressing latent cancer risks. CAA §112(d)(9)—which was added as part of the same 1990 amendments that overhauled the rest of §112—expressly recognizes that the NRC and EPA have overlapping authority to regulate radionuclide emissions from nuclear reactors.[124] If Congress had intended the NRC's risk regulation regime under the AEA to be more stringent than the regime it created under §112 in 1990, then it could have addressed this dual regulation issue simply by exempting NRC-licensed reactors from MACT standards and residual risk review.

Indeed, an early, but ultimately rejected, version of the provision reflected this approach.[125] However, the final version of §112(d)(9) does not provide such an unconditional exemption. Instead, it authorizes EPA to forgo setting a MACT standard for reactor radionuclide emissions only if EPA determines in a notice-and-comment rulemaking that the NRC regulation meets the §112 "ample margin of safety" standard.[126]

In other words, Congress did not presume the applicable NRC regulations would be a sufficient substitute for EPA regulations. Instead, Congress established the §112 "ample margin of safety" standard as the benchmark against which to measure the health-protectiveness of the NRC's regulations.[127] Further, it gave EPA the final word on that evaluation, imposing only the relatively light expectation of "consultation" with the NRC.

For these reasons, there is no basis for concluding that Congress intended the NRC's risk regulatory regime under the AEA to be somehow *more* restrictive than EPA's risk regulation regime under §112 of the CAA. Moreover, there is a basis for concluding that Congress contemplated that the latter would be more health protective than the former.

B. EPA's 1995 Comparative Analysis

Also noteworthy is how EPA implemented the congressional mandate in §112(d)(9) to evaluate the NRC's regulatory regime for nuclear reactors against EPA's own regime. The EPA proceeding to fulfill this mandate provides an apples-to-apples means of comparing the stringency of the two programs in addressing latent cancer risks from routine operations.

Prior to Congress' enactment of §112(d)(9), EPA had established a NESHAP for uranium fuel cycle facilities—a category that included not only nuclear reactors, but also uranium mills and nuclear fuel fabrication facilities.[128] The objective of the NESHAP was to limit emissions of radionuclides from such facilities. In this 1989 rulemaking, EPA used its two-step Benzene NESHAP analysis, which, as discussed above, Congress would codify a year later as an acceptable methodology for setting a NESHAP that ensures an "ample margin of safety." Recall that, under this methodology, a MIR of 100 in one million or less is "presumptively acceptable."

In its NESHAP proceeding for uranium fuel cycle facilities, EPA found that the current radionuclide dose level for individuals within 80 kilometers of such facilities was 10 millirems (mrem)/year or less, measured in terms of effective dose equivalent (EDE).[129] EPA further found that this 10 mrem/year baseline level met the §112 "ample margin of safety" standard.[130] Specifically, EPA found that 10 mrem/year corresponded to a MIR of 150 in one million, which the Agency determined was "essentially equivalent" to the presumptively acceptable level of 100 in one million.[131]

After Congress enacted §112(d)(9) in the 1990 amendments, EPA embarked on a rulemaking to evaluate whether to rescind the uranium fuel cycle facilities NESHAP with respect to NRC-licensed nuclear power reactors. In 1995, EPA finalized the recission rule after finding that the NRC regulations met the §112 "ample margin of safety" standard because the regulations ensured that the radionuclide

124. Section 112(d)(9) provides:

> No standard for radionuclide emissions from any category or subcategory of facilities licensed by the Nuclear Regulatory Commission (or an Agreement State) is required to be promulgated under this section if the Administrator determines, by rule, and after consultation with the Nuclear Regulatory Commission, that the regulatory program established by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act [42 U.S.C. 2011 et seq.] for such category or subcategory provides an ample margin of safety to protect the public health. Nothing in this subsection shall preclude or deny the right of any State or political subdivision thereof to adopt or enforce any standard or limitation respecting emissions of radionuclides which is more stringent than the standard or limitation in effect under section 7411 of this title or this section.

42 U.S.C. §7412(d)(9).

125. *See* S. Rep. No. 101-228, at 203-05 (1989) (bill would have addressed the dual-regulation issue by removing NRC-regulated radioactive materials from the definition of an "air pollutant" under the CAA).

126. In the final conference report for the 1990 amendments, Congress made clear that it intended that EPA's methodology for determining whether the NRC's regime provides "an ample margin of safety to protect the public health" should be the two-step methodology that EPA "set forth in the rulemaking on emissions standards for benzene." *See* 136 Cong. Rec. 35754 (Oct. 26, 1990) (Senate Conference Report for the 1990 Clean Air Act Amendments).

127. Indeed, the legislative history includes statements from some legislators who were reluctant supporters of the final version of §112(d)(9). For example, in the final conference report, then-Rep. Ron Wyden (D-Or.) stated:

> I was also active in negotiations in the toxics title, especially concerning regulation of radionuclides. The Senate was concerned about dual regulation of radionuclides by EPA and the [NRC]. I would observe that even when pursuing the apparently same standard of protecting the public health, EPA has tended to set better, more protective standards and has had better enforcement efforts and mechanism than the NRC. I would encourage the [EPA] Administrator to not abdicate the agency's regulatory role here lightly.

136 Cong. Rec. 35025 (Oct. 26, 1990) (House Conference Report for the 1990 Clean Air Act Amendments). *See also* 136 Cong. Rec. 6443 (Apr. 3, 1990) (Sen. John Glenn (D-Ohio) stated: "The EPA Clean Air Act standards are definitely more protective than those of the [NRC].").

128. National Emission Standards for Hazardous Air Pollutants; Radionuclides, 54 Fed. Reg. 51654 (Dec. 15, 1989) (establishing 40 C.F.R. pt. 60, subpt. I).

129. *Id.* at 51668. The EDE is a weighted sum of doses to the individual organs of the body. The metric weights the dose to each organ according to the risk that dose represents to the organ and then sums the weighted risks. *See id.* at 51662.

130. *Id.* at 51664-65.

131. *Id.* at 51669.

dose level from nuclear reactors would fall well below the 10 mrem/year EDE threshold.[132]

In its recission rulemaking, the Agency found that current dose levels from NRC-licensed reactors were well below the 10 mrem/year EDE threshold and that the NRC had sufficient enforcement mechanisms in place to ensure compliance.[133] EPA determined the then-maximum dose from a nuclear power plant during routine operations was less than 1 mrem/year (i.e., "at least an order of magnitude below" the 10 mrem/year EDE maximum allowed under the "ample margin of safety" determination).[134] Based on these findings, EPA rescinded the portion of the uranium fuel cycle facilities NESHAP that applies to NRC-licensed nuclear reactors.

The enactment of §112(d)(9) and EPA's 1995 rulemaking illustrates that the NRC regulatory regime is far more stringent and restrictive than what Congress contemplated as providing an "ample margin of safety to protect the public health." Accordingly, the NRC has substantial flexibility to modify its regulations to meet the reform mandate in NEIMA while continuing to provide the kind of health protection envisioned by Congress. Yet so far, NRC staff appears to be doubling down on its highly restrictive approach.

C. *Technology-Inclusive Regulatory Design*

The comparison with EPA's §112 regulations also makes clear that the Proposed Part 53 Rule fails to provide the kind of technology-inclusive approach mandated by NEIMA. The closest analog to §112's technology-based MACT standards is the NRC's ALARA standard. However, the MACT approach provides far greater regulatory certainty relative to the vague and indeterminate ALARA standard. The MACT is tied to the performance of the same or similar type of activity.

D. *Regulation of Risks From Accidents*

Also noteworthy are pronounced differences in how the NRC and EPA approach the risk of accidents. the NRC's regulations are based on assumptions that are improbable in the extreme: a catastrophic accident each year, followed by rebuilding the facility. By contrast, the §112 RMP regulations prescribe a set of manageable requirements grounded in real-world experience. And these regulations address a set of risks no less probable or dire than an accident at a nuclear reactor. Indeed, the number of illnesses, injuries, and deaths in the United States from accidents at chemical facilities has exceeded those at nuclear power plants globally.

The NRC's QHO latent cancer risk threshold of two in one million per year represents the risk in the event of a "licensing basis event" accident. This risk metric is not representative of normal operations and does not include an additional value of the margin of safety.[135] By contrast, EPA's 100-in-one-million lifetime residual risk threshold is for routine exposure from normal facility operations and by itself represents an "ample margin of safety"—as affirmed explicitly by Congress in the 1990 amendments. EPA does not provide a specific risk threshold for accident risk.

It is noteworthy that, if the EPA standard would be conservatively assumed to also apply to accident risk, it would be less strict than the NRC's QHOs. Further, the EPA standard is only "presumptive"; in practice, EPA has accepted risk levels above 100 in one million. By contrast, the NRC requires a sufficient additional margin below the two-in-one-million QHO level.[136] Put another way, the NRC requires an applicant to design its reactor such that the risks to the public on its worst conceivable day (a reactor disaster) are still lower than what EPA tolerates from everyday operations.

E. *Comparison to Alternative Forms of Electricity Generation*

In one respect, the NRC's approach is arguably more flexible and responsive to real-world conditions than EPA's §112 regime. As discussed above, the NRC's safety goals provide that the risks associated with a new reactor "should be comparable to or less than the risks of generating electricity by viable competing technologies." In other words, in the safety goals, the NRC identified that, in the absence of the reactor, the same electricity would be provided by an alternative generating technology—and the NRC stated that the risks of the reactor should be compared against the risks attributable to the operation of the alternative form of generation. The EPA §112 regime does not incorporate a similar counterfactual analysis. In a §112 analysis, EPA is not required to "net" the risks attributable to a new facility against the risks attributable to another type of facility supplying the same good or service.

Yet in practice, there is no evidence that the NRC actually engages in this comparative evaluation. There is no step in the regulatory review in which the NRC determines whether the counterfactual to the proposed reactor is a corresponding increase in power output from other generation resources on the regional electricity grid. As a result, there is no step in which the NRC calculates what portion of power on the regional grid is supplied by coal- or natural gas-fired power generators—even though such generators provide a significant proportion of power throughout the country, and, even under ambitious decarbonization scenarios, will continue to do so for a long period of time.[137]

132. National Emission Standards for Radionuclide Emissions From Facilities Licensed by the Nuclear Regulatory Commission and Federal Facilities Not Covered by Subpart H, 60 Fed. Reg. 46206 (Sept. 5, 1995).
133. *Id.* at 46211.
134. *Id.* at 46208.
135. The Commission expects that advanced reactors will provide enhanced margins of safety. *See* NRC, Policy Statement on the Regulation of Advanced Reactors 13 (Oct. 15, 2008), ADAMS Accession No. ML082750370.
136. Sufficient margin is expected below requirements. *See* Proposed Part 53 Rule, *supra* note 16, at 31-136 (new Part 53 draft Framework A).
137. *See, e.g.*, John Bistline et al., *Emissions and Energy Impacts of the Inflation Reduction Act*, 380 Science 1324 (2023), *available at* https://doi.org/10.1126/science.adg3781.

This omission in the NRC's analysis means that the Commission does not take into account the health and welfare impacts attributable to fossil fuel-fired generation. These consequences are substantial. Coal-fired generators are themselves a source of toxic pollutants and are subject to MACT standards.[138] And coal- and natural gas-fired generators are significant sources of ozone and particulate matter (PM)-related pollutants. PM-related pollutants are particularly deadly. According to a 2020 study, PM pollution from fossil fuel-fired electricity generators results in 10,200 deaths annually.[139]

To be sure, EPA also regulates ozone and PM under the CAA. They are "criteria pollutants" subject to national ambient air quality standards (NAAQS). However, NAAQS are significantly more lenient than the §112 standards; NAAQS effectively tolerate significant levels of health and welfare impacts.

To put these tolerated health and welfare impacts in perspective, consider EPA's regulatory action in 2023 to finalize the so-called Good Neighbor Rule under the CAA.[140] The rule is intended to prevent pollution from "upwind" states from significantly contributing to NAAQS-compliance problems in "downwind" states. To this end, the Good Neighbor Rule imposes emission limits on fossil fuel-fired power plants and some industrial facilities in 23 states.

EPA projects that the Good Neighbor Rule's emission limits on covered fossil fuel-fired generators will avoid 310 ozone-related deaths and 440 PM-related deaths each year starting in 2026.[141] Notably, EPA also provides a projection of the health benefits from a more stringent alternative it rejected: 560 premature ozone-related deaths and 1,400 premature PM-related deaths each year avoided. In other words, even after the Good Neighbor Rule goes into effect, the operation of fossil fuel-fired power plants in the covered, primarily eastern states (much less western states not covered by the rule) will continue to cause thousands of deaths every year.

Yet, despite its own internal mandate, there is no evidence that the NRC considers these "risks of generating electricity by viable competing technologies" in determining the relative risk of licensing a new nuclear reactor. It does not consider the extent to which its approach of avoiding even the most remote risks attributable to new advanced nuclear power generation enables the actual, known, and ongoing health, welfare, and climate risks from fossil fuel-fired and other forms of power generation to continue.

VI. Conclusions

In NEIMA, Congress directed the NRC to adopt a risk-informed, performance-based, and technology-inclusive approach for regulating advanced nuclear reactors. Congress intended the new regime to be a departure from the NRC's past approaches. But so far, the Commission seems to be doubling down on its highly restrictive regime with no evident regard for the adverse health and environmental consequences of its approach.

The deep risk aversion of the NRC's approach reveals itself through a comparison with EPA's regime for regulation of sources of HAPs under §112 of the CAA. Congress intended the §112 regime to achieve a high level of health-protectiveness. Indeed, there is evidence that Congress contemplated that, for nuclear reactors, the §112 regime should be the yardstick against which to evaluate the rigor of the NRC's regulations. Yet when EPA undertook a comparative analysis, it found that the NRC regime was reducing cancer-causing radionuclide emissions from reactors to a level at least an order of magnitude lower than the level required under EPA's already stringent, risk-averse, and congressionally codified standard.

For these reasons, EPA's regulatory approaches for HAPs under the CAA provide an illuminating comparative yardstick for rectifying the overly restrictive regulatory approaches taken in the Proposed Part 53 Rule to implement the reform mandates in NEIMA.

First, the comparison makes clear that the NRC has substantial headroom to modify its regulations to meet the NEIMA reform mandates while still ensuring that its regulations preserve an "ample margin of safety." The analysis here underscores that the NRC has significant latitude to streamline and calibrate its regulations to establish a more permissive environment for advanced reactors—with all of their climate and public health benefits—while still protecting the public from the risks of reactor accidents and radionuclide emissions. A different regulatory equilibrium falls well within the NRC's legal authorities.

Second, the particular approaches that EPA has adopted—and Congress has affirmed—for the §112 regime may provide a model for a more streamlined and technology-neutral NRC regime. To be sure, certain elements of the EPA regime may not readily apply to regulation of advanced reactors. For example, it may be some time before the NRC can fashion technology-based standards for advanced reactors because current applications are mostly for first-of-a-kind technologies. However, drawing on the risk assessment and management techniques and methods of EPA and other agencies could help the NRC reform and streamline its regulations to ensure that advanced reactors can realize their substantial potential.

138. 40 C.F.R. pt. 60. EPA is engaged in a residual risk and technology review of the existing MACT standards for coal-fired power plants. On the basis of this review, the Agency has proposed tightening some of these standards. *See* National Emission Standards for Hazardous Air Pollutants: Coal- and Oil-Fired Electric Utility Steam Generating Units Review of the Residual Risk and Technology Review, 88 Fed. Reg. 24854 (Apr. 24, 2023). The proposal observes that three of the HAPs emitted by these facilities—inorganic arsenic, hexavalent chromium, and nickel compounds—are classified as human carcinogens. *Id*. at 24857.

139. Sumil K. Thakrar et al., *Reducing Mortality From Air Pollution in the United States by Targeting Specific Emission Sources*, 7 Env't Sci. & Tech. Letters 639, 640 fig.1 (2020), *available at* https://pubs.acs.org/doi/pdf/10.1021/acs.estlett.0c00424.

140. Federal "Good Neighbor Plan" for the 2015 Ozone National Ambient Air Quality Standards, 88 Fed. Reg. 36654 (June 5, 2023) ("Good Neighbor Rule").

141. U.S. EPA, Regulatory Impact Analysis for the Final Federal Good Neighbor Plan Addressing Regional Ozone Transport for the 2015 Ozone National Ambient Air Quality Standard 215-17 tbls.5-3 and 5-4 (2023) (EPA-452/R-23-001), https://www.epa.gov/system/files/documents/2023-03/SAN%208670%20Federal%20Good%20Neighbor%20Plan%2020230315%20RIA_Final.pdf.

IN CASE YOU MISSED IT . . .

In the Courts

"In the Courts" contains full summaries of court cases reported in *ELR Update* during the month of January 2024. They are listed under the following categories: Air, Climate Change, Energy, Governance, Natural Resources, Toxic Substances, Water, and Wildlife. The summaries are then arranged alphabetically by case name within each category. To access *ELR*'s entire collection of court cases and summaries, visit https://www.elr.info/judicial.

AIR

Texas v. United States Environmental Protection Agency, No. 17-60088, 54 ELR 20012 (5th Cir. Jan. 11, 2024). The Fifth Circuit, 2-1, denied petitions to review EPA's 2016 designation of two counties in Texas as nonattainment for the 2010 sulfur dioxide NAAQS. The state of Texas and the owner of a power plant located in one of the counties sought to have the designation vacated, arguing it violated the CAA because evidence available at the time showed attainment, that EPA treated similarly situated counties in other states differently than the two at issue here, and that EPA misconceived the law in issuing the designation and denying petitions for reconsideration because it erroneously believed it did not have the authority to delay classification until the state gathered monitoring data. The court found EPA did not act arbitrarily or capriciously in designating the two counties as nonattainment, that petitioners failed to present an argument that designation of the counties was inconsistent with the designation of other counties, and that petitioners failed to explain what aspect of the CAA the Agency misconceived when it concluded it did not have discretion to await additional monitoring data before issuing its designation. It denied the petitions.

West Virginia v. United States Environmental Protection Agency, No. 23-1418, 54 ELR 20011 (4th Cir. Jan. 10, 2024). The Fourth Circuit, 2-1, granted West Virginia's motion to stay EPA's disapproval of its SIP addressing "good neighbor" obligations under the revised 2015 air quality standards for ozone. EPA's disapproval found the state would still contribute significantly to nonattainment or interfere with maintenance of the standards in Connecticut and Pennsylvania, in violation of its good neighbor obligations. West Virginia petitioned for review and moved to stay the disapproval pending review, arguing it would be irreparably harmed if it had to proceed now. EPA moved to transfer the petition to the D.C. Circuit or to dismiss it for improper venue. The court found venue was proper because the disapproval was particular to West Virginia's circumstances and applicable only to West Virginia. And it found the state would be irreparably harmed absent a stay because the disapproval would require a response that would consume state labor and resources. It denied EPA's motion to transfer or to dismiss, and granted West Virginia's motion to stay.

CLIMATE CHANGE

District of Columbia v. Exxon Mobil Corp., No. 22-7163, 54 ELR 20002 (D.C. Cir. Dec. 19, 2023). The D.C. Circuit affirmed a district court order remanding to state court a climate liability suit brought against oil and gas companies. The District of Columbia initially sued in state court, arguing the companies deceived consumers about the causal link between fossil fuel usage and climate change by inaccurately advertising their products as "green" and failing to warn consumers about the products' effects on the climate, in violation of the District of Columbia Consumer Protection Procedures Act. The companies removed the suit to federal court, invoking jurisdiction under federal common law, *Grable*, the federal officer removal statute, and the Outer Continental Shelf Lands Act. The federal court remanded the suit for lack of jurisdiction, and the companies appealed. The appellate court found none of these grounds justified removal, in accordance with other suits where state or local governments have brought state-law actions against energy companies for conduct relating to climate change. It affirmed the district court's order remanding the suit to state court.

Juliana v. United States, No. 6:15-cv-01517-AA, 54 ELR 20004 (D. Or. Dec. 29, 2023). A district court granted in part and denied in part the federal government's motion to dismiss a second amended complaint in an ongoing civil rights lawsuit brought by 21 young people. Plaintiffs argued the government promoted the exploitation of fossil fuels despite knowing its actions would significantly endanger plaintiffs and future generations, in violation of the Due Process Clause, the Equal Protection Clause, the Ninth Amendment, and the public trust doctrine. The government moved to dismiss all four claims. The court found plaintiffs adequately alleged a due process claim and stated a claim under a purported public trust doctrine, but that the equal protection claim and the Ninth Amendment claim were not viable. It granted the government's motion with respect to the latter

two claims, but denied it as to the due process and public trust claims.

ENERGY

Louisiana v. United States Department of Energy, No. 22-60146, 54 ELR 20008 (5th Cir. Jan. 8, 2024). The Fifth Circuit granted several states' petition to review DOE's 2022 rule repealing two 2020 rules concerning efficiency standards for dishwashers and washing machines. The states argued the repeal rule, which deleted the appliance categories for shorter-duration dishwashers and washing machines created by the 2020 rules, was arbitrary and capricious. The court found it unclear how or why DOE thought it had statutory authority to regulate "water use" in appliances, since the Energy Policy and Conservation Act does not seem to consider both energy use and water use of a product. But even assuming it had authority, the repeal rule failed to adequately consider appliance performance, substitution effects, and evidence that the conservation standards were causing Americans to use more energy and water rather than less; and it relied on a premise that the 2020 rules were legally invalid, which even if true did not excuse DOE from considering other remedies short of repealing the rules. It granted the petition and remanded to DOE for further proceedings.

United States v. Osage Wind, LLC, No. 4:14-cv-00704-JCG-JFJ, 54 ELR 20003 (N.D. Okla. Dec. 20, 2023). A district court on remand ordered that a commercial wind farm constructed on Osage Nation land be removed in a challenge brought against the farm's developers. The federal government argued the developers engaged in unauthorized mining and excavation in the Osage mineral estate without first obtaining a lease, and sought permanent injunctive relief requiring cessation of the developers' activities. The district court held that the developers' activities did not constitute mining and that a lease was not required. The Osage Mineral Council intervened, and the Tenth Circuit reversed, finding that construction of the farm constituted mining and required a lease. On remand, the district court found that the developers' continued lack of a lease and presence of the farm constituted continuing trespass and ordered the farm to be removed.

GOVERNANCE

Animal Legal Defense Fund v. Reynolds, No. 22-1830, 54 ELR 20009 (8th Cir. Jan. 8, 2024). The Eighth Circuit reversed a district court ruling in a challenge to Iowa's "ag gag" law that criminalizes undercover investigations at agricultural production facilities. Initially, the law prohibited the facilities from being accessed under false pretenses as well as prohibited false statements or misrepresentations being made as part of employment applications there. An appellate court concluded the prohibition on accessing a facility by false pretenses did not violate the Free Speech Clause of the First Amendment, but the prohibition on making false statements in an application was insufficiently tailored and unconstitutional because it encompassed statements that were not material to an employment decision. A new law addressed the materiality problem in the employment provision and narrowed the scope of both provisions by adding an intent element. Nonprofit groups sought to enjoin enforcement, arguing the new law violated the First Amendment. The district court concluded the law was viewpoint-based because the intent requirements targeted speakers with negative views of agricultural facilities; it ruled that the provisions did not satisfy strict scrutiny, and enjoined officials from enforcing the law. The appellate court concluded the law was not a viewpoint-based restriction, but a permissible restriction on intentionally false speech undertaken to accomplish a legally cognizable harm. It reversed the district court ruling, vacated the injunction, and remanded for further proceedings.

Louisiana v. U. S. Environmental Protection Agency, No. 2:23-CV-00692, 54 ELR 20014 (W.D. La. Jan. 23, 2024). A district court granted the state of Louisiana's request to block EPA and DOJ from imposing disparate impact mandates under Title VI of the Civil Rights Act. The state argued the agencies were attempting to create disparate impact mandates under Title VI by regulation without having authority to do so. The court found the agencies had constructed Title VI to allow regulation beyond the statute's plain text, and thus invaded the state's domain. The state also challenged EPA's cumulative impact mandates, which the court found were more than mere suggestions and carried a real threat of enforcement. The court further found the mandates imposed substantial costs on the state, and that the state was entitled to clarity concerning the agencies' power to regulate beyond the plain text of Title VI. It enjoined the agencies from imposing or enforcing any disparate impact-based requirements against the state or any state agency under Title VI and from imposing or enforcing any Title VI-based requirements unless they were ratified by the president and based on requirements found within the four corners of EPA's disparate impact regulations.

NATURAL RESOURCES

North Cascades Conservation Council v. United States Forest Service, No. 2:22-CV-00293-SAB, 54 ELR 20013 (E.D. Wash. Jan. 17, 2024). A district court denied an environmental group's motion for summary judgment in a challenge to the Forest Service's approval of a restoration project in Okanogan-Wenatchee National Forest. The group argued the Service violated NEPA and its implementing regulations in designing, analyzing, and implementing the project, and sought to have the EA and FONSI vacated. The court found the Service took the "hard look" required by NEPA by providing a reasonably thorough discussion of significant aspects of the probable environmental consequences. It denied summary judgment for the group, and granted the Service's cross-motion.

Trenton Threatened Skies, Inc. v. Federal Aviation Administration, No. 22-1965, 54 ELR 20006 (3d Cir. Jan. 4, 2024). The Third Circuit denied petitions to review FAA's FONSI decision approving construction of a new terminal at an airport in New Jersey. Petitioners argued FAA erroneously determined that the project did not expand the terminal and would not induce air traffic growth, failed to consider the cumulative impact of past actions, failed to properly conduct an environmental justice analysis, and failed to perform a health risk assessment as part of its EA. The court found FAA reasonably determined that air traffic would likely grow at the airport regardless of whether a new terminal is built, and that a no-action alternative would fail to meet the purpose and need requirements because the existing terminal was already operating above maximum capacity. It further found FAA determined that the new terminal's impacts, even when combined with other impacts, would not be significant, that it conducted a reasonable environmental justice analysis, and that it acted reasonably in deciding not to conduct a health risk assessment. The court denied the petitions.

WASTE

Mobile Baykeeper, Inc. v. Alabama Power Co., No. 1:22-00382-KD-B, 54 ELR 20007 (S.D. Ala. Jan. 4, 2024). A district court dismissed a RCRA citizen suit over a closure plan for a coal-fired power plant in Alabama. An environmental group challenged the plan, arguing it was unlawful to permanently store over 21 million tons of coal ash and toxic pollutants in the existing unlined impoundment, situated in wetlands adjacent to the Mobile River. The plant owner moved to dismiss for lack of standing and ripeness. The court found the coal ash pollution about which the group complained—ongoing leaching of coal ash from the plant into the Mobile River—existed before the plant began closure and thus was not fairly traceable to implementation of the closure plan. Further, the plan being challenged was not final and not ripe for review. The court dismissed the suit for lack of subject matter jurisdiction.

WATER

Lewis v. United States, No. 21-30163, 54 ELR 20001 (5th Cir. Dec. 18, 2023). The Fifth Circuit vacated a district court ruling in a decades-long dispute over whether a property in Louisiana contains federally regulated wetlands. The property owner sued the Army Corps of Engineers, arguing its determination that the property contained federal regulated wetlands was arbitrary and capricious. The owner moved for summary judgment, and the Corps moved for voluntary remand. The district court granted the Corps' motion and dismissed the owner's motion as moot. The appellate court held the U.S. Supreme Court's decision in *Sackett v. Environmental Protection Agency*, 53 ELR 20083 (2023), controlled and that the property lacked wetlands with a continuous surface connection to "waters of the United States" in their own right. It remanded with instructions to enter judgment in favor of the property owner that the tracts in question are not "waters of the United States" under *Sackett*.

Stone v. High Mountain Mining Co., LLC, No. 22-1340, 54 ELR 20005 (10th Cir. Jan. 3, 2024). The Tenth Circuit reversed a district court finding of a CWA violation in a citizen suit brought against the operator of a gold mine in Colorado. Plaintiffs argued the operator violated the CWA because seepage from the mine's settling ponds flowed into the groundwater and then migrated to the Middle Fork of the South Platte River. The district court agreed that the settling ponds were a point source and found that their operation constituted an unpermitted discharge of pollutants into navigable waters. The appellate court reversed, holding the district court made a legal error in concluding that the evidence was sufficient to show the functional equivalent of a direct discharge into the tributary. Finding that the district court failed to consider all the relevant geophysical factors relevant to the particular circumstances at issue, it remanded to the district court for further proceedings consistent with *County of Maui v. Hawaii Wildlife Fund*, 50 ELR 20102 (U.S. 2020).

WILDLIFE

Sierra Club v. National Marine Fisheries Service, No. DLB-20-3060, 54 ELR 20010 (D. Md. Jan. 9, 2024). A district court granted environmental groups' motion to lift a stay of a suit challenging NMFS' biological opinion (BiOp) concerning oil and gas activity in the Gulf of Mexico. The groups initially argued NMFS issued a flawed BiOp that underestimated the risks of harm to protected species and took inadequate measures to mitigate those risks. They subsequently agreed to a stay in reliance on NMFS' representations that measures to protect the Rice's whale would be in place for the duration of the stay. Oil and gas companies intervened and asked another court to enjoin two of the measures, which the court did. The groups then moved to lift the stay. The district court found that because some of the measures the groups were counting on to secure their interests during the stay were no longer in place, there was good cause to lift the stay. NMFS simultaneously moved to remand without vacatur, but the court found it was neither substantial nor legitimate, would not serve the interest in judicial economy, and would unduly prejudice the groups. It denied NMFS' motion to remand, and granted the groups' motion to lift the stay.