Testimony of Patrick White, PhD, Group Lead for Fusion Safety and Regulation

Clean Air Task Force

Legislative Hearing to Examine S. ____ Build Nuclear with Local Materials Act; Discussion Draft S. ___ RECHARGE Act; and Discussion Draft S. ____ Enrichment Licensing Modernization Act

Before the United States Senate Committee on Environment and Public Works Subcommittee on Clean Air, Climate and Nuclear Innovation and Safety

May 20, 2026

Madam Chairman Lummis, Ranking Member Kelly, and Distinguished Members of the Subcommittee:

My name is Dr. Patrick White, and I am the Group Lead for Fusion Safety and Regulation and an Advanced Nuclear Technology and Regulation Expert at Clean Air Task Force (CATF).

Clean Air Task Force is a nonprofit organization dedicated to advancing the policy and technology changes necessary to achieve a zero-emissions, high-energy economy at an affordable cost. We work to advance a full suite of low-carbon energy and other climate- and public health-protecting technologies, including next-generation geothermal energy, carbon capture and storage, fusion energy, and nuclear energy. CATF is a pragmatic, non-ideological advocacy group with a broad range of scientific, technical, legal, and policy expertise, nearly 30 years of experience in climate and energy policy, and a commitment to exploring all potential solutions.

In my role, I lead CATF's work to address the regulatory and safety issues for fusion energy technology and nuclear energy. I also provide technical insights on all aspects of fission and fusion technology, fuel cycles, and regulation for both CATF experts and external stakeholders. I hold an M.S. and PhD in Nuclear Science and Engineering from the Massachusetts Institute of Technology, where my theses focused on the safety analysis, regulation, and licensing of commercial fission and fusion technologies.

Thank you for the opportunity to testify today on the bills under discussion by the subcommittee.

Nuclear energy can help us meet our environmental, energy, and economic goals

Nuclear energy has great potential to decarbonize the world's energy system at the scale and speed needed to meet the climate challenge while providing energy security, promoting economic growth, and ensuring global competitiveness.[1]

Nuclear energy is a proven, clean energy source that can generate electricity 24/7, providing reliable dispatchable power that complements other energy sources. Nuclear energy is an essential tool for meeting growing global energy demands without increasing harmful greenhouse gas emissions, especially in sectors that are difficult to electrify, such as heavy industry, transportation, and heat.

[1] Advanced Nuclear Energy – Clean Air Task Force

CATF is helping to catalyze private and public sector action through the Nuclear Scaling Initiative (NSI)[2] which is a collaborative effort of Clean Air Task Force, the EFI Foundation, and the Nuclear Threat Initiative to quickly and economically scale to deploy tens of gigawatts of safe and secure nuclear energy globally per year by the 2030s. NSI works hand-in-hand with key stakeholders to build a nuclear energy ecosystem that can deliver safe, secure reactors on time and on budget by addressing key issues related to construction, financing, and regulation of new nuclear energy technologies.

Effective, efficient, and predictable regulation for nuclear energy technologies will be critical to reducing commercial risk and increasing investment for new nuclear energy projects, accelerating development of supply chains and creating orderbooks for new nuclear reactors, and ensuring public trust in nuclear technology. CATF and our NSI partners collaborate with regulators and competent authorities worldwide to develop coherent licensing frameworks, share technical information, and expedite review processes without compromising safety or public trust.

Effective regulation is critical for the successful deployment of new nuclear reactors

Effective nuclear regulation is critical to the deployment and operation of nuclear reactors because it has direct impacts on the physical safety, economics, and social acceptance of nuclear energy.

First, effective nuclear regulations must ensure safety by protecting workers, public health and safety, and the environment. The Nuclear Regulatory Commission (NRC) emphasizes the importance of safety in their updated mission statement and considers it the "North Star" that guides their activities.[3] Regulation provides the assurance that activities will not create unacceptable risks or harm to workers, the public, or the environment. Licensees are responsible for safety, but regulatory reviews help ensure that private activities do not cause public harm. Effective regulation should, however, be proportional and based on the hazards or risks that are subject to regulation. Regulations that are "right sized" for activities and facilities enable both licensees and regulators to focus on the issues that are most important to safety. A clear and consistent understanding of safety with an emphasis on proportional requirements is critical to effective nuclear regulation.

[2] Nuclear Scaling Initiative
[3] SECY-25-0031: NRC Mission Statement Implementation Guidance

Second, effective nuclear regulation and its implementation by applicants, licensees, and regulators need to be efficient and predictable for society to realize the benefits of nuclear energy. Nuclear energy technologies require substantial investments of time and capital to design, manufacture, construct, and commission but can provide energy, economic, and environmental benefits for decades. These projects, however, cannot move forward if there is substantial uncertainty related to the requirements, expectations, time, or cost associated with licensing. Licensing processes that are overly lengthy or unpredictable can deter or stop investment in technology or projects. Regulation must ensure safety, but if the regulatory processes are unusable due to the requirements, expectations, time, cost, or uncertainty, they amount to an effective prohibition on activities. Applicants, licensees, and regulators all play important roles in ensuring effective regulation for nuclear technology and enabling society to benefit from the use of nuclear technology.

Third, effective nuclear regulatory processes must help maintain public trust in nuclear energy and nuclear technology. Regulation is not just a technical analysis or box-checking exercise – it is also a social process. The requirements, people, processes, visibility, and outcomes all matter in determining whether an activity or facility is effectively regulated. If stakeholders do not trust nuclear regulations, regulators, or regulatory processes to protect workers, public health and safety, and the environment, they will push back on nuclear energy projects. Loss of public trust in nuclear regulation would damage bipartisan legislative support for policies that accelerate the deployment of advanced nuclear energy, catalyze public opposition to new nuclear energy projects, and increase economic risks associated with new nuclear reactors and deter development and deployment. Activities that seek to accelerate the deployment of nuclear energy in the near-term by minimizing opportunities for public engagement or oversight of nuclear technology licenses risk the long-term public acceptance of nuclear regulation and nuclear energy technology.

Effective nuclear regulation is a prerequisite for successfully deploying nuclear energy in the near-term and the long-term so that we can realize the environmental, energy, and economic benefits.

Effective regulation requires use of the right regulatory tool at the right time

Effective nuclear regulation does not occur by accident or serendipity – it is the product of continuous work by legislators, regulators, licensees, and other stakeholders to structure and implement effective safety regulations and processes. Nuclear licensing is:

- built on legislation (i.e., Atomic Energy Act [AEA]),

- developed through regulation (i.e., Title 10 of the Code of Federal Regulation [CFR]),
- supported by regulatory guidance (e.g., NUREGs), and
- implemented by regulators, applicants, and licensees.

The final regulatory process and outcomes must meet the societal expectations and needs of public stakeholders who express their input through public meetings, comments, and through their elected officials. Deliberate balance of requirements and direction in legislation, regulation, and guidance, and successful implementation by stakeholders results in an effective regulatory framework.

Gaps, weaknesses, or deficiencies in legislation, regulation, guidance, and implementation can produce a regulatory framework that is not effective, efficient, and predictable. For example, imprecise or outdated definitions in the AEA or unnecessary or missing regulations in the CFR can create legislative and regulatory challenges. Incomplete or overly prescriptive regulatory guidance or difficulty by NRC staff or applicants to effectively implement statutory or regulatory requirements can create guidance and implementation challenges.

Effectively resolving regulatory challenges requires identification of the specific underlying challenge and selecting the right regulatory tool to correct the underlying gap, weakness, or deficiency. Addressing the underlying regulatory challenges enables legislators, regulators, licensees, and other stakeholders to create more effective regulatory frameworks while reducing the risk of unintended regulatory consequences associated with overly broad or imprecise changes to regulatory frameworks.

Congress plays an important role in ensuring effective nuclear regulation

Congress, with the leadership of the Senate Environment and Public Works Committee, has passed major pieces of nuclear legislation in the past 10 years and conducted continuous regulatory oversight that has helped modernize the regulatory framework for nuclear energy.

The Nuclear Energy Innovation and Modernization Act (NEIMA), signed into law in 2019, directed the NRC to develop new regulations for advanced reactors (later becoming 10 CFR Part 53) and update internal NRC processes.[4] This legislation started the development of a new pathway for advanced reactor licensing at the NRC and catalyzed work at NRC to modernize the regulations for new reactors.

[4] S.512 - 115th Congress (2017-2018): Nuclear Energy Innovation and Modernization Act | Library of Congress

The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act, signed into law in 2024, directed the NRC to make major changes related to the licensing and regulation of nuclear energy.[5] In particular, it directed NRC to take action on new reactor licensing and fuels, supported hiring and retention of NRC workforce, and created initiatives to ensure efficient and predictable licensing reviews.[6] The NRC has worked diligently to implement the congressional direction in the ADVANCE Act, and the effects of the legislation are already visible in the successful and timely completion of licensing reviews for several advanced reactors, including TerraPower, Kairos Power, and Natura Resources.[7]

Congress' and Senate Environment and Public Works Committee's deliberate approach to nuclear regulatory reform in the past 10 years has created a more effective NRC that has been able to effectively and efficiently license new nuclear reactors. In the next 10 years, the fundamental role of the NRC will remain the same, but the scope and importance of work is likely to increase. The NRC may be asked to license dozens of new nuclear reactors per year to meet the rising demand for clean, reliable, and affordable energy, and meet the growing calls to double, triple, or quadruple nuclear energy production by mid-century.[8,9,10] The NRC must continue to provide effective, efficient, predictable, and transparent regulation so that the progress made to date on the development and deployment of nuclear energy is not undermined. Congress and Senate Environment and Public Works Committee will continue to play an important role in ensuring effective nuclear regulation by the NRC.

The proposed legislation addresses legislative and regulatory challenges for nuclear reactor construction and environmental reviews and uranium enrichment facility licensing.

The proposed legislation under discussion during today's hearing seeks to address a variety of gaps, weaknesses, or deficiencies in the licensing, environmental reviews, and construction requirements for new nuclear reactors and uranium enrichment facilities. CATF supports the intent of all the bills under consideration today to enable more effective, efficient, and predictable regulations for nuclear technology and accelerate nuclear energy deployment. There are several targeted changes, however, that we believe would improve

[5] S.870 - 118th Congress (2023-2024): Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act | Library of Congress
[6] About the ADVANCE Act | Nuclear Regulatory Commission
[7] Advanced Reactor Application Projects | Nuclear Regulatory Commission
[8] Fission Vision: Doubling Nuclear Energy Production | Nuclear Innovation Alliance
[9] U.S. Sets Targets to Triple Nuclear Energy Capacity by 2050 | Department of Energy
[10] Energy Department Is Delivering on Accelerating the Deployment of Nuclear Power | Department of Energy

the bills by addressing the underlying gap, weakness, or deficiency in the licensing process and enabling greater transparency and public engagement in the rulemaking process.

Build Nuclear with Local Materials Act of 2026 (S. 4529)

Background

There are detailed regulatory quality standards and quality assurance requirements for critical systems, structures, and components (SSCs) used in nuclear reactors. These quality requirements were developed to address issues encountered in 1966 and 1967 during the construction of the Oyster Creek reactor in New Jersey.[11] Defects and deficiencies were detected in reactor coolant system piping during construction, and further inspections revealed significant quality issues in many plant systems that had already been installed. While the owner of Oyster Creek was able to work with the Atomic Energy Commission (AEC) to repair the defective SSCs and ultimately operate the plant, the incident highlighted the importance of quality control – especially in plant SSCs that were important to safety.

In response, the AEC developed and promulgated new regulations on quality assurance in Appendix B of 10 CFR Part 50 in 1970.[12] These Part 50 quality assurance requirements became the basis for producing what are now known as "nuclear-grade" components. Components produced under other quality assurance programs are known as "commercial-grade" components.

Since 1970, NRC regulations for quality assurance requirements on SSCs have evolved based on industry experience, development of supplement quality standards in other industries, and increased use of risk-informed regulatory approaches that can more accurately characterize the importance of individual SSCs to reactor safety.

Historically, SSCs were grouped into two categories: safety-related and non-safety. Safety-related SSCs were relied upon to either complete or directly support a plant safety function or ensure that the failure of a component would not affect safety-related SSCs.[13] All other components are classified as non-safety-related SSCs. Components classified as safety-SSCs are subject to the quality assurance requirements in 10 CFR Part 50 Appendix B and are considered "nuclear-grade" SSCs. Nuclear-grade SSCs are generally higher cost and have more limited supply chains due to the additional quality assurance requirements for

[11] Walker, J. S., & Mazuzan, G. T. (1992). *Containing the Atom: Nuclear Regulation in a Changing Environment, 1963-1971*. University of California Press. p. 214.
[12] 35 FR 10499
[13] 10 CFR Part 50.10(a)(1)

their production, as specified in 10 CFR Part 50 Appendix B.[14] High quality commercial-grade SSCs produced under other industry quality standards (e.g, ISO-9001) may have similar performance and reliability as a comparable nuclear-grade SSC but not meet the specific regulatory requirements in 10 CFR Part 50 for safety-related reasons.[15]

Increased use of probabilistic risk assessment (PRA) methodologies during the design and license application phase by applicants have enabled more precise classification of the safety significance of individual SSCs. Rather than relying on simple regulatory rules related to possible SSCs interactions to define "safety-related" and "non-safety-related" SSCs, PRA models enable more specific classification of SSCs based on quantification of the change risk due to SSC failure. For example, NRC-endorsed guidance on developing risk-informed licensing bases for nuclear power plants provides methodologies for classifying SSCs as safety-related, non-safety-related with special treatment, and non-safety-related with no special treatment based on risk contribution associated with an SSC in the plant PRA model.[16,17] These different SSC classifications enable use of different quality assurance requirements that are proportionate to the SSC's risk significance. This enables the right-sizing of quality assurance requirements (and the associated SSC costs) based on actual risk significance of an SSC rather than relying on prescriptive regulatory requirements. This regulatory treatment process, however, is not currently allowed in NRC regulation.

The NRC has already granted regulatory exemptions for new reactor applicants such as TerraPower for the Natrium project to exclude certain SSCs from classification as safety-related SSCs based on more detailed analysis of the safety significance of plant SSCs.[18] In its exemption request approval, NRC found that the change "will not present an undue risk to the public health and safety, and is consistent with the common defense and security".[19] These exemptions enable TerraPower to use commercial-grade SSCs for certain non-safety-related with no special treatment SSCs that would have otherwise required nuclear-grade

[14] The Future of Nuclear Energy in a Carbon-Constrained World, p. 143.
[15] SECY-03-0117
[16] NEI 18-04, Rev. 1, "Risk-Informed Performance-Based Technology-Inclusive Guidance for Non-Light Water Reactors"
[17] Regulatory Guide 1.233, Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors
[18] ML25119A331: Notification of the Issuance of the Exemption from Certain Requirements
[19] Ibid.

SSCs. This change helps accelerate construction by increasing the number of suppliers who can provide these commercial-grade SSCs and lowering the cost of these SSCs.

Updating NRC regulations to explicitly allow use of commercial-grade SSCs in certain non-safety-related SSCs would help accelerate the construction and reduce the cost of future nuclear reactors and would provide greater regulatory certainty for applicants. This update would also eliminate the need for future applicants to spend time and resources on similar regulatory exemption requests for other applications; similarly, it would reduce the time and resources for NRC staff and management to review and approve exemption requests.

Proposed legislation

S.4529 would direct NRC to initiate a rulemaking to authorize the use of commercial-grade steel and concrete in non-safety structures in nuclear power plants subject to certain exceptions. It builds upon the existing regulatory exemption granted to TerraPower for the Natrium project, and codification of this pathway in regulation would enable future applicants to leverage the same regulatory pathway without the need for regulatory exemptions. This legislation could help accelerate the construction of new nuclear reactors and reduce the costs of construction.

Overall, I believe that this is an excellent approach to solve the underlying issue of gaps between modern license applications that have more detailed safety classification of SSCs and existing prescriptive regulatory requirements on quality assurance standards.

First, the bill builds on existing NRC licensing precedent that demonstrates that the NRC, following the full regulatory exemption process, was able to determine that the change does not have an impact on public health and safety or the environment, and that it meets all other existing regulatory requirements. This ensures that there is a clearly documented and technically defensible basis for the change to the regulations. It also demonstrates that rulemaking would eliminate the need for exemptions for future applicants.

Second, the bill's direction to NRC to initiate the rulemaking process enables NRC to develop a regulatory basis for the rule following agency procedures. Doing so will provide an opportunity for public input and comment, allowing all stakeholders to provide input on the rule and enable NRC to evaluate comments to determine if any additional changes or clarifications are needed for the final rule. This deliberate and transparent process can both reduce the risk of unintended regulatory consequences and increase public confidence in the changes.

Finally, directing NRC to make the changes in regulation (CFR) will allow the Commission to make future changes to the rule if lessons learned or best practices emerge related to use of commercial-grade steel and concrete in non-safety structures in nuclear power plants.

It is helpful to note that the NRC could initiate this rulemaking on its own through either staff-identified need, Commission or Executive Director of Operations (EDO) direction, or an external stakeholder petition for rulemaking.[20] Nonetheless, congressional direction is the best way to ensure NRC makes the changes that Congress believes can help accelerate and lower the cost of new nuclear reactor construction.

Revitalizing Energy Communities by Hosting Advanced Reactors and Generating Energy (RECHARGE) Act of 2026 (S. ____)

Background

Environmental reviews and regulatory evaluations completed to meet the statutory requirements of the National Environmental Policy Act (NEPA) of 1969 are intended to require Federal officials to 'stop, look, and listen' before making decisions that can impact the human environment.[21] The NEPA review process documents the potential environmental impacts of a "major federal action", with varying levels of review and analysis based on significance of the possible environmental impacts of such action.

There are three types of NEPA reviews that can be completed to meet the law's statutory requirements.[22] The first type of NEPA review is a review and engagement process that culminates in an environmental impact statement (EIS) and a record of decision (ROD). An EIS is required when "a proposed Federal action may significantly affect the human environment" or if an agency or applicant chooses to require an EIS for an activity where the effects are unknown or could be significant but are not fully characterized. This is the longest and most detailed form of NEPA review, requiring the most time and resources to complete.

The second type of NEPA review is a review and engagement process that culminates in an environmental assessment (EA)[23]. As part of the EA, an agency will assess whether the action will have "significant environmental effects". If there are no significant impacts, the agency will issue a "finding of no significant impact" (FONSI) for the action. If significant impacts are expected, the agency will then prepare an EIS and ROD for the action. Agencies may use an

[20] The NRC Rulemaking Process | Nuclear Regulatory Commission
[21] NEPA and NHPA - Handbook for Integrating NEPA and Section 106
[22] Ibid.
[23] Ibid.

EA to meet the statutory requirements in NEPA if the action is not expected to have significant impacts but the agency has not made prior determinations or there is uncertainty for the specific action. This form of NEPA review requires less time and fewer resources than an EIS but can require subsequent preparation of an EIS (with the associated time and resource requirements) if the EA review determines that significant impacts may occur.

The third type of NEPA review is a review process that determines that an action is eligible for a categorical exclusion (CE),[24] which describes a "category of actions that are expected not to have individually or cumulatively significant environmental impacts." Each agency has processes for the definition and public review of new CEs. If an action qualifies under an existing CE category and there are "no extraordinary circumstances", then there is no need for additional reviews under NEPA and the CE applicability for the action is documented. This form of NEPA review requires the least amount of time and resources to complete but can require significant work in advance to create and justify new CE categories.

The NEPA review process does not result in a "pass" or "fail" for a proposed action; instead, the NEPA review process focuses on adequately scoping, reviewing, analyzing, publicly engaging, and documenting the possible environmental impacts of the action or decision. The NRC has regulations and internal processes that it uses to implement NEPA reviews for agency activities. The NRC's NEPA regulations are codified in 10 CFR Part 51 and are detailed in regulatory guidance (e.g., for nuclear reactors in NUREG-1555).[25,26] Completing reviews in accordance with these regulations and guidance meet NEPA's statutory requirements. Under existing NRC regulation in 10 CFR Part 51.20, issuance of an authorization, permit, or license to site, construct, and operate a nuclear reactor requires an EIS.[27]

Preparation of an EIS for new nuclear reactors has historically required significant resources and time to complete. Development of the EISs to support new large light water nuclear reactor combined license applications in the 2000s and 2010s required between 2 – 6 years from initial EIS scoping through completion of ROD and cost several millions of dollars to complete (billed hourly to applicants). [28] The final EISs consisted of thousands of pages of documented review and inputs from external stakeholders.

[24] NEPA and NHPA - Handbook for Integrating NEPA and Section 106
[25] 10 CFR Part 51
[26] NUREG-1555: Standard Review Plans for Environmental Reviews for Nuclear Power Plants
[27] 10 CFR Part 51
[28] Improving the Efficiency of NRC Power Reactor Licensing: Environmental Reviews

Congress and the NRC have both taken steps to address the time and cost associated with the NEPA reviews of new nuclear reactors. The Fiscal Responsibility Act (FRA) of 2023 amended NEPA to include timeline and page limits on NEPA reviews and enabled agencies to adopt CEs developed by other agencies.[29] These changes were intended to reduce the time and cost associated with NEPA reviews across the federal government. The ADVANCE Act of 2024 directed the NRC to review opportunities to streamline and modernize environmental reviews for new reactors and consider how to accelerate the environmental reviews and licensing of new nuclear reactors at brownfield and retired fossil fuel sites.[30]

Since the passage of the FRA and the ADVANCE Act, the NRC staff has produced several reports and documents related to NEPA reviews for new reactors and licensing of licensing of new nuclear reactors at brownfield and retired fossil fuel sites:

- NRC Report to Senate Environment and Public Works Committee: Modernization of Nuclear Reactor Environmental Reviews Report
- NRC Report to Senate Environment and Public Works Committee: Regulatory Issues for Nuclear Facilities at Brownfield Sites
- NUREG-2249, "Generic Environmental Impact Statement for Licensing of New Nuclear Reactors" Final Report

Additionally, per Executive Order 14300, "Ordering the Reform of the Nuclear Regulatory Commission,"[31] the NRC is currently preparing a proposed rule to revise the NEPA regulations contained in Part 51.[32] The rulemaking is expected to include streamlining NEPA implementation, reducing regulatory burden associated with NEPA reviews, and expanding flexibility for NEPA implementation. The proposed rule is expected to be published on May 26, 2026.

Proposed legislation

This draft legislation aims to accelerate licensing and deployment of advanced reactors at brownfield sites or retired fossil fuel sites by streamlining the NEPA review process. Specifically, the draft legislation provides that licensing qualifying advanced reactors at covered sites are not "considered to be a major Federal action" under NEPA and that they

[29] Fiscal Responsibility Act of 2023
[30] ADVANCE Act of 2024
[31] Executive Order 14300: Ordering the Reform of the Nuclear Regulatory Commission
[32] Planned Rulemaking Activities: Implementation of the National Environmental Policy Act | Nuclear Regulatory Commission

are "categorically excluded from the requirements" of NEPA.[33] The draft legislation also provides that any related transmission lines or infrastructure for qualifying advanced reactors are exempt from NEPA. Advanced reactors at covered sites can qualify for "categorical exclusion" by demonstrating that:[34]

1. The construction and site work for the advanced reactor is consistent with the previously disturbed nature of the site and will not result in any additional significant adverse environmental impacts.
2. The advanced reactor attributes sufficiently reduce the risk of off-site consequences from radiation or hazardous materials
3. Hazardous waste, radioactive waste, and spent nuclear fuel will be managed according to applicable laws
4. Other infrastructure upgrades are located on previously disturbed areas and will not result in any additional significant adverse environmental impacts.

If an applicant meets the conditions specified in the draft legislation, they would not be required to complete any NEPA reviews and would be categorically excluded from NEPA by statute.

While we agree with the general intent of the draft legislation, we do not believe that the bill as written is the best way to expedite the environmental reviews for advanced reactors at brownfield sites or retired fossil fuel sites. Specifically, the bill would:

- create a legislative CE for an activity that an agency has not previously determined would not result in any significant impact individually or cumulatively to the human environment,
- require a new regulatory review equivalent to an EA to assess applicability of the project for the legislative CE,
- create a legislative CE for a subset of reactor license application that is inconsistent with existing NRC NEPA implementation for other nuclear reactors, and
- limit opportunities for stakeholder input and feedback through a legislated definition of a CE rather than creation of a CE through rulemaking.

[33] Draft Legislative Text for Revitalizing Energy Communities by Hosting Advanced Reactors and Generating Energy Act of 2026
[34] Ibid.

Each of these challenges could prevent the draft legislation from meeting its intent of reducing the regulatory burden associated with environmental reviews of advanced reactors at covered sites.

The first major challenge is that the proposed bill would create a legislative CE for an activity that an agency has not previously determined would not result in any significant impact individually or cumulatively on the human environment. The NRC has only completed four NEPA reviews to date for advanced reactors:

- NUREG-2268, "Environmental Impact Statement for the Construction Permit Application for Kemmerer Power Station Unit 1" Final Report
- NUREG-2263, "Environmental Impact Statement for the Construction Permit for the Kairos Hermes Test Reactor" Final Report
- Environmental Assessment and Finding of No Significant Impact for the Construction Permits and Environmental Review Exemptions for the Kairos Hermes 2 Test Reactors, Final Report
- Environmental Assessment for Abilene Christian University Molten Salt Research Reactor

The NRC has limited experience reviewing the environmental impacts of advanced reactors. Only one of the four completed NEPA reviews was for a commercial advanced reactor (Kemmerer Power Station Unit 1) and only two of the completed NEPA reviews were for a covered site as defined in the bill (brownfield site for the Hermes 1 and 2 reactors). The NRC has not determined that the siting and operation of an advanced reactor on a covered site will not result in any significant effect on the human environment. While definition of a CE for advanced reactors on a covered site could be supported in the future based on additional environmental reviews, there is not sufficient record of evidence at this time to technically justify a legislative CE for all qualifying advanced reactors deployed at any covered site.

The second major challenge is that the proposed bill would trigger a new regulatory review equivalent to an EA to assess whether the legislative CE applies to a project. The proposed bill would only apply to qualifying reactors and any associated qualifying infrastructure that can demonstrate they would have construction, operational, safety, and waste characteristics that do not result in any additional significant adverse environmental impacts. While these qualification criteria are intended to help ensure that any project qualifying for the legislative CE would not have additional significant adverse environmental impacts, they effectively become the equivalent of an EA for the project. In this way, the bill

would not reduce required reviews but would simply shift the review from a public process to an internal agency one. Doing so would reduce the opportunity for public solicitation and engagement that is integral to the NEPA process. Additionally, the NRC would need to develop regulations or guidance on how to complete these qualification reviews, and it is not clear whether existing regulatory processes or precedents could be used to do so.

The third major challenge is that the proposed bill would create a legislative CE for a subset of reactor license application that is inconsistent with existing NRC NEPA implementation for other nuclear reactors. The NRC is currently required by regulation (10 CFR Part 51) to prepare an EIS for issuance of an authorization, permit, or license to site, construct, and operate a nuclear reactor. Recently, the NRC has used regulatory exemptions to enable the preparation of EAs instead of EISs for the issuance of construction permits for the ACU MSRR[35] and Kairos Power Hermes 2[36], and the NRC is discussing providing further regulatory exemptions to enable the preparation of an EA for the Long Mott Xe-100 project.[37] The existing NEPA framework in Part 51 provides predictability and consistency, and the regulations could be updated by rulemaking to enable use of EAs for all advanced reactors or even create a CE for advanced reactors at covered sites. Use of a legislative CE for a subset of reactors, however, would create significant inconsistencies in how the NRC completes environmental reviews and could reduce regulatory effectiveness.

The fourth major challenge is that the proposed bill limits opportunities for stakeholder input and feedback by legislating a definition of a CE rather than allowing NRC to promulgate a CE through rulemaking. When the NRC creates a new CE through rulemaking in 10 CFR Part 51, the NRC is required to provide detailed justification and analysis as part of the proposed rule that documents the technical and regulatory basis for the new CE. This proposed rule is then subject to public review and comment, enabling stakeholders to both review the NRC justification for the new CE and provide comment on the scope and conditions of the CE. After incorporating stakeholder comments on the new CE, the NRC could publish the final rule and add the CE to 10 CFR Part 51. This public process is incredibly valuable to both ensuring the rule is effective by incorporating feedback from a variety of stakeholders and increases public trust in the regulation and regulatory process by clearly documenting and justifying the CE. As stated earlier, NEPA is intended as a process-based statute and not an

[35] Environmental Assessment for Abilene Christian University Molten Salt Research Reactor
[36] Environmental Assessment and Finding of No Significant Impact for the Construction Permits and Environmental Review Exemptions for the Kairos Hermes 2 Test Reactors, Final Report
[37] Long Mott Generating Station Construction Permit Application Review Schedule and Resource Estimate

outcomes-based statute with the goal of informing decision makers and stakeholders on the possible environmental effects of federal actions. Use of a legislative CE rather than promulgating a CE through rulemaking reduces the opportunities for public engagement and discussion integral to the NEPA process.

Possible modifications to legislation

Overall, I believe that the draft legislation can be modified to more effectively meet the underlying intent of the bill, create more effective regulation for the environmental reviews of advanced reactors at covered sites, and accelerate the deployment of advanced reactors. These changes would enable the Committee to use the appropriate legislative, regulatory, and implementation tools to resolve the identified regulatory weaknesses for NEPA reviews.

The NRC has completed significant work to date on NEPA reviews and covered sites and has several projects ongoing in response to congressional and executive direction in the FRA, ADVANCE Act, and EO-14300. The Committee could revise the legislation to direct the NRC to evaluate and report how existing regulatory changes will impact the environmental reviews of advanced reactors at existing sites and how the NRC can most effectively utilize CEs from other agencies (i.e., those related to electrical transmission infrastructure) to accelerate environmental reviews. Addressing the underlying process implementation of NEPA (along with adequate NRC staffing and resources) will be more valuable than making a change specifically for advanced reactors at brownfield sites or retired fossil fuel sites. Broader programmatic changes can accelerate deployment of advanced reactors without creating challenges related to a new legislative CE with underdefined qualification criteria.

If the Committee is interested in creating a CE or permitting use of an EA for advanced reactors at covered sites, the Committee could revise the legislation to direct NRC to initiate a rulemaking to revise 10 CFR Part 51. While a rulemaking process would take longer than creation of a legislative CE, the rulemaking process would clearly document the NRC justification for creation of a CE, provide opportunities for public input and engagement, and ensure that the NEPA process for advanced reactors at covered sites is in line with the other NEPA processes and requirements in 10 CFR Part 51.

NEPA review processes are not currently a bottleneck for advanced reactors under development today. We should take the time to create a regulatory solution that ensures that we meet the intent of NEPA while still enabling the deployment of advanced nuclear energy. The NRC has been making great progress on updating regulations based on congressional

and executive direction and should be given time to complete its work before Congress makes additional statutory changes.

Enrichment Licensing Modernization Act of 2026 (S. ____)

Background

From the 1940s through the 1980s, uranium enrichment facilities were exclusively federal government owned and operated. Uranium enrichment activities for defense applications and commercial nuclear power plants (after 1954) were completed at facilities in Oak Ridge TN, Paducah KY, and Portsmouth OH that were owned and operated by the AEC and later by the Department of Energy (DOE).[38]

Uranium enrichment facilities were considered "production facilities" under Section 11(v) of the Atomic Energy Act (AEA) prior to 1990 because they produced special nuclear material (i.e., enriched uranium) from source material (i.e. natural enrichment uranium).[39] This statutory difference separated uranium enrichment facilities from other nuclear fuel cycle facilities, including uranium conversion and fuel fabrication facilities, because these facilities would process source material or special nuclear material but could not produce special nuclear material. Uranium enrichment facilities were initially subject to the licensing processes and regulations in 10 CFR Part 50 applicable to all production and utilization facilities.[40]

In the 1980s, DOE began to explore opportunities to privatize existing U.S. government uranium enrichment facilities and allow private companies to participate in the U.S. uranium enrichment program by building and operating their own uranium enrichment facilities.[41] As companies began developing plans for constructing and operating private uranium enrichment facilities, the NRC staff began reviewing the regulatory framework that would be applied to commercial uranium enrichment facilities and potential gaps or deficiencies in the existing regulations.[42]

NRC staff and stakeholders recognized that uranium enrichment facilities posed hazards and raised regulatory issues like uranium conversion facilities licensed under 10 CFR Part 40 and fuel cycle facilities licensed under 10 CFR Part 70. However, because the Atomic Energy

[38] Megawatts to Megatons to Megawatts: The Story of the Paducah Gaseous Diffusion Plant
[39] 53 FR 13276
[40] 10 CFR Part 50
[41] 51 FR 11811
[42] 53 FR 13276

Act defined uranium enrichment facilities as production facilities, they were required to be licensed under 10 CFR Part 50, like nuclear reactors. This statutory definition imposed a more prescriptive regulatory framework on uranium enrichment facilities.

In 1988, the NRC published an advanced notice of proposed rulemaking (ANPR) to create a new regulatory framework in 10 CFR Part 76 specifically for private commercial uranium enrichment facilities.[43] The goal was to create a new regulatory framework that incorporated aspects from 10 CFR Part 40, Part 50, and Part 70 that specifically addressed the regulatory issues associated with uranium enrichment facilities. The NRC also developed draft general design criteria for uranium enrichment facilities and assessed the applicability of existing safeguards and accountancy requirements. The NRC received comments from uranium enrichment companies, utilities, and other stakeholders on the ANPR during the public comment period in spring and summer of 1988.[44]

In 1989, NRC commissioners voted to not develop new regulations in Part 76 for uranium enrichment facilities.[45] Comments on the ANPR pushed back on the NRC development of 10 CFR Part 76 and instead advocated for regulatory guidance to be used to support licensing of uranium enrichment facilities under 10 CFR Part 50.[46] The NRC paused any additional rulemaking absent feedback from stakeholders that the existing regulatory pathway in Part 50 was a barrier for near-term applicants or any additional legislative direction from Congress.[47]

In parallel during the late 1980s, former Senator Bennett Johnston (D-LA), who was Chairman of the Senate Energy and Natural Resources Committee, had been developing legislative changes to the AEA to simplify the regulatory framework for uranium enrichment facilities. It is important to note that in the 1980s and 1990s, the company Urenco was looking at building a uranium enrichment facility in Homer, Louisiana, so effective and efficient licensing of uranium enrichment facilities was particularly relevant to Senator Johnston and his constituents.[48]

[43] 53 FR 13276
[44] ML23156A405: Regulation of Uranium Enrichment Facilities
[45] SECY-89-107
[46] ML23156A405: Regulation of Uranium Enrichment Facilities
[47] SECY-89-107
[48] 45 NRC 367

In 1989 and 1990, Senator Johnston exchanged several letters with NRC Chairman Kenneth Carr requesting NRC feedback on the implications of changing the regulatory framework for uranium enrichment facilities.

Initially, Senator Johnston had proposed a simple change to the AEA definition of a "production facility" to exclude uranium enrichment facilities. This change would have enabled NRC to license uranium enrichment facilities under Part 40 and Part 70 rather than under Part 50. NRC confirmed that staff believed that it would be appropriate to license uranium enrichment facilities under the existing Part 40 and Part 70 frameworks.[49]

Legislators on the House Interior Committee, however, appear to have raised questions on how changes to the regulatory framework would affect other licensing aspects for uranium enrichment facilities.[50] In response, Senator Johnston provided a list of questions to NRC Chairman Carr in a February 1990 letter that focused on the potential implications of changing the legislative definition and regulatory framework for uranium licensing facilities:[51]

1. What provisions of the regulations under Part 50 are inappropriate for uranium enrichment facilities?
2. What is the difference in the procedures that would be applied in the licensing process, for example, with respect to:
    i. the opportunity for public participation?
    ii. the number of hearings and whether or not hearings would be held?
    iii. hearing procedures (right to cross examination, discovery, etc.) review of decisions by the hearing examiner or hearing board
3. What is the difference in antitrust review?
4. Is there a difference in the requirements for compliance with the National Environmental Policy Act (Environmental Impact Statement vs. Environmental Assessment)?
5. With respect to regulation of the facility, is there a difference in
    i. the quality assurance procedures that would be required?
    ii. operator qualification requirements?
    iii. the frequency and type of inspection?
    iv. emergency planning requirements?
    v. indemnification required or available under the Price-Anderson Act?

[49] ML20245F180: Letter to Senator Johnston
[50] 136 Cong. Rec. 32760
[51] ML20033G547: Letter to Chairman Carr

vi. waste management?
vii. nuclear non-proliferation protection?
viii. the role of State regulatory authorities?

6. Please describe any other significant differences in the treatment of uranium enrichment facilities that would result from the enactment of the amendment.
7. What is the Commission's view as to the impact of any differences on the public health and safety?

The NRC responded to Senator Johnston's questions in March 1990.[52] While those responses supported the argument that uranium enrichment facilities could be effectively regulated under Part 40 and Part 70, they also highlighted possible gaps in the new regulatory framework. Specifically, changing the regulatory framework for uranium enrichment facilities could create gaps in hearings, NEPA reviews, liability insurance, decommissioning, and inspection requirements because the existing source material and special nuclear material regulatory frameworks in Part 40 and Part 70 did have similar requirements and processes to those currently found (and applicable) in Part 50.

After hearings in Spring 1990 and discussion throughout the summer of 1990, House Interior Committee and Senate Energy Committee leadership agreed to a compromise change to uranium enrichment facility licensing.[53] The AEA amendment (added to the Solar, Wind, Waste, and Geothermal Power Production Incentives Act of 1990) changed the definition of a production facility in the AEA but added new licensing requirements for uranium enrichment facilities to the AEA.[54] Legislators believed that the additional licensing requirements for uranium enrichment facilities would close gaps in the existing regulatory framework in Part 40 and Part 70. Representative George Miller (D-CA7) summarized the changes during floor debate on the bill:[55]

> "The compromise language provides for the following procedural safeguards that were not contained in the Senate-passed licensing amendment:
>
> - Provision for a mandatory full adjudicatory public hearing prior to the issuance of a combined construction/ operation license.

[52] ML20033G547: Letter to Senator Johnston
[53] 136 Cong. Rec. 32760
[54] H.R.4808 - 101st Congress (1989-1990): Solar, Wind, Waste, and Geothermal Power Production Incentives Act of 1990 | Library of Congress
[55] 136 Cong. Rec. 32760

- Requirement that an environmental impact statement be completed prior to the issuance of a combined construction/ operation license.
- Requirement that the licensee maintain liability insurance to cover all liability claims related to the operation of the enrichment facility.
- Requirement that the licensee provide assurance that funds are available for decommissioning and decontamination of the facility through either pre payment, surety or performance bond, or external sinking fund.
- Requirement that the Commission verify through inspection that the facility has been constructed in accordance with its license before permitting operation of the facility.

The compromise bill also prohibits the Federal Government from providing any insurance subsidy to a private enrichment facility through the Price Anderson Act. Under current law, the NRC has the discretion to provide Price-Anderson coverage to a private enrichment facility, but is not required to do so."

The amendment passed in 1990 and created the basis for the uranium enrichment facility licensing process that we use to this day. Uranium enrichment facilities can be licensed using the regulatory frameworks in Part 40 and Part 70 but also have prescriptive requirements in the AEA on hearings, environmental reviews, and construction.

Discussion on existing uranium enrichment facility licensing frameworks

While the 1990 amendments to AEA on uranium enrichment facility licensing were an effective compromise between legislators that facilitated uranium enrichment facility licensing, it is important to recognize the inadvertent challenges created by the AEA amendments. While the amended arguably added additional public protections related to uranium enrichment facility licensing, the amendments were made in legislation and not regulation. These changes created prescriptive requirements in the AEA for uranium enrichment facilities licensing and regulation before the NRC had any experience licensing commercial uranium enrichment facilities. Creating new legislative requirements in the AEA rather than directing the NRC to make changes in regulation provided legal certainty for stakeholders but removed the NRC's ability to modify the licensing process over time based on lessons learned without additional legislation. While these changes met the needs of Congress to enable compromise on uranium enrichment facility licensing in 1990, they were not following best practices on creating effective regulations for emerging technologies.

Specifically, lessons learned and emerging best practices on the licensing, construction, commissioning, and operation of nuclear reactors included in changes to 10 CFR Part 50 and Part 51 (related to environmental reviews, pre-license approval construction activities, and mandatory hearings) could not be incorporated into the licensing framework for uranium enrichment facilities because the requirements for uranium enrichment facilities were defined in statute and not regulation. Congress and this Committee have supported changes to modernize the licensing processes for nuclear reactors, and amending the regulatory requirements for uranium enrichment facilities in the AEA can similarly help modernize the licensing process for uranium enrichment facilities.

Proposed legislation

This draft legislation aims to accelerate licensing and deployment of uranium enrichment facilities by eliminating prescriptive requirements related to environmental reviews, hearings, and pre-license construction. Specifically, the draft legislation addresses legacy prescriptive requirements in the AEA added by the 1990 amendments for uranium enrichment facilities. The draft legislation removes statutory requirements for preparation of an environmental impact statement and completion of a mandatory hearing prior to construction but still requires that the applicant follow existing NRC guidance for NEPA reviews and other public hearings. The bill also creates a statutory approval for pre-license construction activities for uranium enrichment facilities and pathways for redress and remediation of any construction activities that are not ultimately approved or completed. At a high level, these changes reflect updated regulatory processes for licensing and regulation of other nuclear fuel cycle facilities in 10 CFR Part 40 and Part 70, as well as for nuclear reactors in Part 50 and Part 51.

Overall, we agree with the intent of the bill to modernize the licensing of uranium enrichment facilities and reduce barriers to new uranium enrichment capacity in the United States. Catalyzing domestic uranium enrichment production is important to the successful deployment of new nuclear reactors.

Utilities in the United States rely on foreign enrichment facilities to provide most of the low enriched uranium (LEU) used in existing U.S. nuclear reactors.[56] Only 20% of LEU enrichment services purchased by utilities in 2024 were provided by U.S. origin companies, primarily from Urenco's existing uranium enrichment facility in Eunice, NM. An additional 20% of LEU enrichment services purchased by utilities in 2024 were provided by Russian companies,

[56] 2024 Uranium Marketing Annual Report

primarily the Russian state-owned company TENEX. While the remaining portion of enrichment services is provided by companies in U.S. allied countries (including France, Germany, the Netherlands, and the United Kingdom), increasing domestic uranium enrichment capacity is key to U.S. energy independence and energy security if the United States will significantly increase production of nuclear energy by mid-century.

Additionally, the United States currently has very limited capacity to commercially produce high-assay, low-enriched uranium (HALEU) required for many advanced reactor technologies. The U.S.-based company Centrus currently produces limited quantities of HALEU under contract with DOE, but U.S. companies are currently reliant on either Russian-origin HALEU or U.S. government supplied material allocated from legacy scientific and defense stockpiles of enriched uranium. These existing supply chains are not a viable pathway forward for widescale deployment of advanced reactors. New domestic uranium enrichment facilities capable of producing HALEU are needed.

Congress, the DOE, and private companies, including Urenco, Orano, Centrus, Global Laser Enrichment (GLE), and General Matter, have all expressed interest in expanding U.S. uranium enrichment capacity.[57] Modernizing the licensing requirements and processes for uranium enrichment facilities can help catalyze investment in uranium enrichment facilities by reducing the time and cost associated with licensing and accelerate construction by enabling specific pre-license construction activities.

While amending the AEA is needed to modernize environmental reviews and licensing hearing requirements, it's not clear if additional text needs to be added to the AEA or if the changes can be made by the NRC through rulemaking. Table 1 summarizes the existing and proposed legislative and regulatory requirements for production and utilization facilities, uranium enrichment facilities, and other uranium fuel cycle facilities (i.e., conversion or fuel fabrication facilities) in legislation (AEA) and regulation (CFR). The statutory and regulation requirements for nuclear reactors, uranium enrichment facilities, and other uranium fuel cycle facilities are shown together in Table 1 to show the spectrum of requirements and processes that are already in place for facilities in 10 CFR Part 50, Part 40, and Part 70.

[57] U.S. Department of Energy Awards $2.7 Billion to Restore American Uranium Enrichment | Department of Energy

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Table 1. Summary of Existing and Proposed Regulatory Requirements for Enrichment Facilities

Licensing Requirements	Requirement Location	Facility Type			
		Nuclear Reactors	Uranium Enrichment Facilities (Existing)	Uranium Enrichment Facilities (Proposed)	Other Uranium Fuel Cycle Facilities
Environmental Reviews (NEPA)	Atomic Energy Act (AEA)	None	EIS required prior to license hearings (42 USC 2243(a)	NEPA is applicable for uranium enrichment facility licensing (42 USC 2243(a))	None
	Code of Federal Regulation (CFR)	EIS required for construction, operation, or LWA (Part 51.20(b)(1-4))	EIS required (Part 51.20(b)(10)	EIS required (Part 51.20(b)(10)	EIS required (Part 51.20(b)(7-8)
Mandatory Hearings	Atomic Energy Act (AEA)	Mandatory hearing prior to construction (42 USC 2239 (a)(1)(A))	Single adjudicatory hearing (42 USC 2243(b))	Hearings conducted at request of affected persons (42 USC 2243(b))	None
	Code of Federal Regulation (CFR)	Hearing process detailed (Part 50.58)	Hearing process detailed (Part 70.23a)	Updated regulations based on future NRC rulemaking	None
Pre-License Construction and Redress Plan	Atomic Energy Act (AEA)	None	None	Proposed new pre-license construction process and redress plan (42 USC 2243(e))	None
	Code of Federal Regulation (CFR)	Limited Work Authorization and Redress Plan (Part 50.10)	None permitted for fuel cycle activities before environmental and safety reviews (Part 70.23(a)(7),(b)) (Part 40.32(e))	Updated regulations for pre-license construction and redress plans based on future NRC rulemaking	None permitted for fuel cycle activities before environmental and safety reviews (Part 70.23(a),(b)) (Part 40.32(e))

Possible modifications to legislation

Overall, the draft legislation should be modified to more effectively meet the underlying intent of the bill and create more effective regulation for uranium enrichment facilities. These changes would enable the Committee to use the appropriate legislative, regulatory, and implementation tools to accelerate the licensing and deployment of uranium enrichment facilities.

I agree with the draft legislation's approach to amend the AEA to remove the existing statutory requirements on environmental reviews and hearing requirements specific to uranium enrichment facilities. The revised AEA language specifies that uranium enrichment facilities are still subject to NEPA and thus the NRC regulations and implementation processes for NEPA would be applied to uranium enrichment facilities. Under the existing NRC regulations in 10 CFR Part 51, a uranium enrichment facility would still require an EIS. Removing statutory requirements on the type of NEPA review for uranium enrichment facilities, however, would provide greater future regulatory flexibility if the NRC staff and Commission believe that other review process could meet the NEPA requirements (e.g., use of EAs for future uranium enrichment facilities).

Similarly, removal of the statutory requirement for a mandatory hearing on uranium enrichment facilities aligns with work by external stakeholders, NRC, and Congress to update and modernize the NRC's mandatory hearing processing and requirements for nuclear reactors.[58,59,60] Doing so would also enable NRC to update the hearing requirements and processes through rulemaking as they evolve agency-wide.

Instead of creating new statutory requirements and processes for pre-license construction and redress plans, I believe that it would be more effective for the Committee to provide legislative direction to the NRC to add these requirements and processes through rulemaking. Creating a new regulatory process similar to the limited work authorization (LWA) (10 CFR 50.10) for uranium enrichment facilities in regulation rather than in statute would result in a more effective rule and regulatory framework than placing these processes and requirements in statute.

Directing NRC to initiate a rulemaking to incorporate these process changes would enable public engagement and comment on the changes, align the regulatory frameworks for

[58] Improving the Efficiency of NRC Power Reactor Licensing: The 1957 Mandatory Hearing Reconsidered
[59] 91 FR 20063
[60] S.1757 - 119th Congress (2025-2026): Efficient Nuclear Licensing Hearings Act | Library of Congress

different uranium fuel cycle facilities, and enable future updates to regulation through rulemaking as NRC and industry experience with uranium fuel cycle licensing increases. This would enable the NRC to create appropriate regulatory requirements, guidance, and implementation processes for pre-license construction of uranium enrichment facilities without the need to update or clarify specific regulatory requirements in the AEA. This pre-license construction regulatory framework has been successfully applied for nuclear reactors and could be applied using similar regulatory logic for uranium enrichment facilities.

Additionally, legislative changes to the AEA and then congressional direction to the NRC for rulemaking would enable effective near-term and long-term regulation. In the near-term, NRC could grant regulatory exemptions to applicants to enable pre-license construction as it completes the rulemaking, supported by clear congressional direction and intent. In the long-term, the applicants would have a clear regulatory pathway that builds on NRC experience with LWAs, and the NRC would have flexibility to make regulatory changes as needs arise.