INL/RPT-25-84292

Recommendations to Improve Nuclear Licensing

Update to INL/RPT-23-72206, *Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process*

APRIL 2025

Stephen J. Burdick, J.D., John C. Wagner, Ph.D., and Jess C. Gehin, Ph.D.

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Battelle Energy Alliance manages INL for the U.S. Department of Energy's Office of Nuclear Energy

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and Jess C. Gehin, Ph.D.
Idaho National Laboratory

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Idaho National Laboratory
Idaho Falls, Idaho 83415

http://www.inl.gov

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ACRONYMS

ACRS	Advisory Committee on Reactor Safeguards
ADVANCE	Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy
AEA	Atomic Energy Act
AEC	Atomic Energy Commission
AI	Artificial Intelligence
BEA	Battelle Energy Alliance, LLC
CEQ	Council on Environmental Quality
COL	Combined License
CP	Construction Permit
DCA	Design Certification Application
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
ERA	Energy Reorganization Act
ERDA	Energy Research and Development Administration
ESP	Early Site Permit
FEMA	Federal Emergency Management Agency
FFRDC	Federally Funded Research and Development Center
GEIS	Generic Environmental Impact Statement
INL	Idaho National Laboratory
ISP	Interim Storage Partners
LWA	Limited Work Authorization
MARVEL	Microreactor Applications Research, Validation, and Evaluation
MCRE	Molten Chloride Reactor Experiment
M&O	Management and Operations
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NIA	Nuclear Industry Alliance
NRC	Nuclear Regulatory Commission
NR GEIS	New Nuclear Reactor GEIS
NWPA	Nuclear Waste Policy Act
OL	Operating License
R&D	Research and Development

RHDRA	Rapid High-Volume Deployable Reactors in Remote Applications
SER	Safety Evaluation Report
TREAT	Transient Reactor Test Facility

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1. INTRODUCTION AND SUMMARY

Idaho National Laboratory (INL) is a multi-program U.S. Department of Energy (DOE) Federally Funded Research and Development Center (FFRDC). Its primary focus is to function as the nation's nuclear energy research, development, and demonstration laboratory providing and directing resources and capabilities to support nuclear energy, national security, and other applied energy missions. Battelle Energy Alliance, LLC (BEA) is the management and operations (M&O) contractor for INL. Given the responsibilities at INL, BEA has personnel with extensive knowledge and experience related to current and advanced nuclear systems and associated technologies, including their operations, regulations, and licensing processes.

In 2023, various stakeholders asked for BEA's thoughts and recommendations to improve the U.S. Nuclear Regulatory Commission's (NRC)[1] licensing review and approval process. This included an April 14, 2023 request from the House Committee on Energy and Commerce on "information and recommendations to improve the licensing review and approval process, . . . as well as the siting, licensing, construction, and oversight of advanced nuclear reactor technologies."

In response to these requests, BEA prepared and published INL/RPT-23-72206, *Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process* (2023 Report).[2] The 2023 Report included 13 recommendations related to streamlining NRC hearings, expediting NRC safety and environmental reviews, otherwise improving NRC licensing, and providing financial benefits to new reactor projects. Many of these earlier recommendations were addressed through various legislative actions or changes made by the NRC. Section 2 of this report addresses the current status of those earlier recommendations.

BEA recently received a new request from the House Committee on Energy and Commerce seeking any suggestions for additional areas to examine or potential reforms "that may assist in modernizing the licensing and regulatory process that affects civil nuclear deployment." Additionally, the new Secretary of Energy has identified initial DOE actions to support unleashing the golden era of American energy dominance, including "Unleash Commercial Nuclear Power in the United States" and "Streamline Permitting and Identify Undue Burdens on American Energy."[3]

Given these developments, BEA has prepared a new set of updated recommendations in this report. The recommendations include updated versions of recommendations from the 2023 Report which have not been fully adopted, as well as entirely new recommendations. This set of recommendations has a slightly broader focus with some recommendations focused on DOE authorizations and some recommendations related to nuclear licensing beyond new reactors. Each recommendation below also identifies whether the recommendation would require legislative action or could be addressed directly by the respective agency.

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[1] This paper generally uses "NRC" to refer to the entire agency. "Commission" is used to refer to the 5-member Commission which heads the NRC. "NRC Staff" refers to NRC employees other than the Commission.

[2] https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_65730.pdf.

[3] Memorandum from C. Wright, Secretary of Energy, to Heads of Departmental Elements, Unleashing the Golden Era of American Energy Dominance (Feb. 5, 2025), *available at* https://www.energy.gov/articles/secretary-wright-acts-unleash-golden-era-american-energy-dominance.

As an M&O contractor for an FFRDC, BEA is a long-term partner with the Government in seeking to achieve energy goals, yet has a level of independence needed to appropriately evaluate these topics. The views herein are informed by extensive BEA experience supporting nuclear energy endeavors including ongoing discussions with current and former regulators, nuclear reactor developers, applicants, licensees, and other stakeholders.

With this background in mind, the United States benefits from having robust nuclear regulatory oversight from NRC and DOE. Notwithstanding many improvements over the past years, however, nuclear licensing can present significant time and cost challenges. Thankfully, reforms to the licensing process have the potential to greatly increase efficiency and predictability and support the successful progress of new reactors and other nuclear activities. Recognizing the potential tradeoffs with any proposed changes, this report attempts to highlight those considerations in the analysis of the reforms. The recommendations are presented as a set of options for consideration. Unless noted, they are independent options, offering stakeholders the option to select a subset for further consideration.

As described in more detail in Section 3 below, the following recommendations should facilitate nuclear licensing activities in the United States:

- **Reforms to NRC and DOE Nuclear Licensing Authority**

3.1.1. Extend the allowable duration of an initial NRC license for a reactor from up to 40 years to up to 60 years to ensure certainty of that additional 20 years of operation.

3.1.2. Address recent court decision in which the U.S. Court of Appeals for the Fifth Circuit ruled, contrary to other Federal appellate courts and legislative text, that the NRC does not have the authority to license away-from-reactor spent fuel storage facilities.

3.1.3. Allow DOE to authorize any non-commercial demonstration nuclear reactor projects with no exceptions.

3.1.4. Broaden DOE's statutory authority to allow it to authorize construction and operation of commercial nuclear reactor projects on Federal lands.

3.1.5. Clarify that DOE may authorize offsite DOE activities for which it has statutory authority, including activities not located on Government-owned and controlled sites, without any NRC approval.

- **Reforms to Streamline NRC Hearings**

3.2.1. Remove the requirement in the Atomic Energy Act of 1954, as amended (AEA) for the NRC to hold an uncontested "mandatory hearing" for new reactor licensing actions, saving months from the critical path for those actions.

3.2.2. Require use of a simplified hearing process for NRC contested new reactor licensing proceedings, instead of the existing lengthy and costly hearing procedures.

- **Reforms to Expedite Environmental Reviews**

3.3.1. Given the importance of new nuclear reactors, eliminate the requirement to perform National Environmental Policy Act (NEPA) reviews for all new nuclear projects and related activities, whether under the jurisdiction of NRC or DOE.

3.3.2. Exclude non-commercial reactor projects on DOE sites from NEPA, whether subject to DOE authorization or NRC licensing.

3.3.3. DOE and NRC consider and implement new categorical exclusions under NEPA for construction and operation of new nuclear reactors, removing the potential impact of NEPA reviews to new reactor regulatory approvals.

- **Reforms to Improve Safety Reviews**

3.4.1. License advanced nuclear reactors according to the Section 104 standard for "minimal amount" of regulation necessary for the NRC to satisfy its obligations under the AEA to promote the common defense and security and to protect the health and safety of the public.

3.4.2. Reduce the excessive burden of Advisory Committee on Reactor Safeguards (ACRS) reviews by limiting its reviews to unique or new safety issues having significant hazard potential.

3.4.3. Allow non-public meetings between the NRC Staff and applicants to facilitate the efficiency of licensing reviews, while retaining the extensive information and processes otherwise available to the public.

3.4.4. Provide flexibility to new reactor applicants to use existing meteorological data rather than the time consuming and burdensome practice of building a new meteorological tower and collecting 1-3 years of data prior to application submission.

3.4.5. For applications to the NRC for construction and/or operation of a microreactor (≤50 MWe) previously approved by the NRC, require the NRC to complete its review and issue a licensing decision within three months.

3.4.6. Significantly improve the time and cost of licensing small nuclear reactors by implementing a general license approach for those reactors meeting pre-determined criteria and avoiding the need to submit a specific license application.

In summary, although there have been many recent and ongoing efforts to incorporate efficiency and timeliness into nuclear licensing, much more can be done. This report identifies potential reforms which should individually and collectively result in significant efficiency and predictability improvements. If implemented, these reforms have the potential to enhance the United States' stature as a world leader in nuclear safety to also include leadership in timely and efficient nuclear licensing.

2. STATUS OF PRIOR RECOMMENDATIONS

As noted above, the 2023 Report included 13 recommendations related to streamlining NRC hearings, expediting NRC safety and environmental reviews, otherwise improving NRC licensing, and providing financial benefits to new reactor projects. Many of these earlier recommendations were addressed in full or part through various actions. The following list repeats the 13 recommendations, using the numbering from the 2023 Report, and then provides a discussion about their current status. This information informed the updated recommendations provided in Section 3 below. The Section 3 recommendations entirely supersede those from the 2023 Report.

2.1.1. Remove the Atomic Energy Act requirement for the NRC to hold an uncontested "mandatory hearing" for select new reactor licensing actions, saving approximately six months from the critical path for the actions.

- The mandatory hearing requirement has not been eliminated yet. As discussed in Section 3.2.1 below, the NRC has made some process changes to shorten the duration of the mandatory hearing. Although this is an improvement, the mandatory hearing requirement should be eliminated. Both houses of Congress have a pending bill titled, "Efficient Nuclear Licensing Hearings Act" (H.R.6464, S.4288), which would satisfy this recommendation.
- A revised version of this recommendation is provided in Section 3.2.1 below.

2.1.2. Remove the NRC contested hearing opportunity on environmental topics to align with the traditional public comment and challenge process under NEPA.

- No action has been taken on this recommendation.
- In order to keep the focus on other environmental and hearing changes, and given the potential for additional court appeals with this change, this recommendation is not carried forward.

2.1.3. Require use of a simplified legislative hearing process for NRC contested new reactor licensing proceedings, instead of the existing lengthy and costly hearing procedures.

- The NRC hearing process has not been modified to incorporate a simplified legislative hearing process. Both houses of Congress have a pending bill titled, "Efficient Nuclear Licensing Hearings Act" (H.R.6464, S.4288), which should satisfy this recommendation.
- This recommendation is repeated in Section 3.2.2 below.

2.2.1. Clarify the NRC's mission statement from a singular safety focus to include the timely and efficient licensing of new nuclear projects, similar to other safety-focused federal agencies such as the Federal Aviation Administration.

- This recommendation has been fully satisfied through Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act Section 501 and the NRC's corresponding revision of its mission statement.
    - Earlier mission statement: "The NRC licenses and regulates the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment."
    - Revised mission statement: "The NRC protects public health and safety and advances the nation's common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through

efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment."[4]

2.2.2. Reduce the excessive burden of ACRS reviews by limiting its reviews to unique or new safety issues referred by the Commission as having significant hazard potential.

- The proposed legislative changes related to limiting the burden from the ACRS have not been adopted. There is some indication that the ACRS is more focused on efficiency,[5] but the legislative changes would provide further and enduring changes.
- A revised version of this recommendation is provided in Section 3.4.2 below.

2.2.3. Allow non-public meetings between the NRC Staff and applicants to facilitate the efficiency of licensing reviews, while retaining the extensive information and processes otherwise available to the public.

- No action has been taken on this recommendation.
- This recommendation is repeated in Section 3.4.3 below.

2.2.4. Exclude small (< 20 megawatts thermal) non-commercial reactor projects on DOE sites from NEPA, whether subject to DOE authorization or NRC licensing.

- No action has been taken on this recommendation. There has been some further discussion of NEPA requirements as part of ADVANCE Act Section 506, but further changes are needed.
- A revised version of this recommendation is provided in Section 3.3.2 below.

2.2.5. Formulate an external review team to shadow an entire NRC licensing review start to finish and provide recommendations to further streamline the licensing process, including appropriate application of the reasonable assurance standard.

- No action has been taken on this recommendation.
- Because of the significant discussion of improving efficiencies and need to focus on implementation, as well as the ongoing NRC management changes to support more focused review, this recommendation is not carried forward.[6]

2.3.1. Strengthen the requirements for NRC milestones for new reactor licensing activities, including shorter timelines, more rigid reporting requirements, and accounting for the full duration of licensing activities.

- ADVANCE Act Section 504 addressed this recommendation by (1) shortening the period for reporting delays in meeting performance metrics or milestone schedules to the appropriate congressional committees from 180 days to 90 days; and (2) requiring the Commission to review

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4 About NRC, https://www.nrc.gov/about-nrc.html; Staff Requirements – SECY-24-0083 – Mission Statement Update Options Pursuant to Subsection 501(a) of the ADVANCE Act of 2024 (Jan. 24, 2025), *available at* https://www.nrc.gov/docs/ML2502/ML25024A040.pdf.

5 *See, e.g.*, ACRS Member Guidance (July 2024) (providing numerous references to performing ACRS reviews efficiently and effectively), *available at* https://www.nrc.gov/docs/ML2419/ML24199A160.pdf.

6 Other organizations continue to make separate recommendations about how the NRC and other stakeholders can reform the licensing process. *See, e.g.*, Nuclear Innovation Alliance, Key Recommendations for Reforming U.S. Nuclear Energy Regulation (July 2024) (providing recommendations to Congress, the Commission, NRC Management and Staff, and Advanced Reactor License Applicants, including a recommendation for establishing an independent Regulatory Reform Panel to evaluate NRC's institutional culture and management effectiveness), *available at* https://nuclearinnovationalliance.org/sites/default/files/2024-07/Key%20Recommendations%20for%20Reforming%20U.S.%20Nuclear%20Energy%20Regulation.pdf.

and update the metrics and schedules at least every three years "to provide the most efficient metrics and schedules reasonably achievable."

2.3.2. Clarify which non-commercial demonstration nuclear reactor projects may be authorized by DOE versus licensed by the NRC.

- No action has been taken on this recommendation.
- A revised version of this recommendation is provided in Section 3.1.3 below.

2.4.1. Modify the NRC fee structure for the licensing of new nuclear reactors or otherwise provide financial support for those projects.

- ADVANCE Act Title II addressed this recommendation with changes such as modifying fees for advanced nuclear reactor application reviews (Section 201); imposing advanced nuclear reactor prizes (Section 202); and excluding certain costs for enabling preparations for the demonstration of advanced nuclear reactors on DOE or critical national security infrastructure sites (Section 204).[7] As one example of implementation, the NRC recently issued a proposed rule amending its fees with changes to address the ADVANCE Act, including a proposed reduced hourly rate ($146) for certain advanced nuclear reactor pre-applicants/applicants.[8]

2.4.2. Permit foreign investment by U.S. allies in U.S. nuclear projects licensed by the NRC as long as the Commission determines that the entity is not inimical to common defense and security or the health and safety of the public.

- ADVANCE Act Section 301 addressed this recommendation by loosening restrictions that prevented friendly countries from participating in new reactor projects in the United States.

2.4.3. Indefinitely extend the Price-Anderson Act coverage for nuclear hazards indemnification for covered DOE contractors and NRC licensees.

- The Further Consolidated Appropriations Act, 2024 extended the Price-Anderson Act by 40 years (until December 31, 2065) and broadened the liability coverage and applicability to non-Government owned material for certain international nuclear activities. Although the recommendation was for an indefinite extension, the 40-year extension is significant and addresses this topic for a long time. Therefore, this recommendation is not included below.

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[7] Other organizations have made recommendations on NRC fee structure reform. *See, e.g.*, Bipartisan Policy Center, Licensing and Permitting Reforms to Accelerate Nuclear Energy Deployment, at 7-9 (Jan. 2024) ("BPC 2024 Report"), *available at* https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2024/01/BPC_Nuclear-Permit-License-Reform-Issue-Brief.pdf.

[8] Proposed Rule, Fee Schedules; Fee Recovery for Fiscal Year 2025, 90 Fed. Reg. 9848, 9861-865 (Feb. 19, 2025); *see also* Power, NRC Proposed Deep Fee Cuts for Advanced Nuclear (Feb. 20, 2025), *available at* https://www.powermag.com/nrc-proposes-deep-fee-cuts-for-advanced-nuclear/.

3. AREAS OF REFORM FOR NUCLEAR LICENSING

3.1. Reforms to NRC and DOE Nuclear Licensing Authority

3.1.1. Extend the Duration of NRC Reactor Licenses

- *Recommendation: Extend the allowable duration of an initial NRC license for a reactor from up to 40 years to up to 60 years to ensure certainty of that additional 20 years of operation.*
- *Status: New recommendation.*
- *Implementation: Requires legislative change.*

Section 103c of the Atomic Energy Act of 1954, as amended (AEA) states that a commercial license for a nuclear reactor "shall be issued for a specified period, as determined by the Commission, depending on the type of activity to be licensed, but not exceeding forty years from the authorization to commence operations . . . ."[9] Section 103c further states that the license "may be renewed upon the expiration of such period."[10] The NRC regulations explain that the license may be renewed, or extended, for a period of time not to exceed 20 years.[11] The license may be renewed for additional 20 year terms.[12] Therefore, an initial NRC commercial reactor operating license is for 40 years, but may be extended for additional 20 year terms.

The NRC has explained that the initial 40-year license limit is for economic and antitrust reasons rather than technical ones. Specifically, the NRC has stated: "The original licenses for commercial nuclear power facilities were granted for a 40-year period, which was set by the Atomic Energy Act of 1954 and the NRC's regulations. It was imposed for economic and antitrust reasons rather than technical limitations of the nuclear facility."[13]

Much has changed since the initial 40-year limit was first imposed. The nuclear industry and the NRC have a tremendous amount of experience with operating and regulating safe nuclear reactors, and nuclear plants have not created any concerns from an economic or antitrust standpoint. Economic issues are addressed by other Federal and State regulatory bodies, not the NRC. Additionally, almost all large commercial nuclear power plants have extended their initial operating licenses from 40 to 60 years,[14] and some have even extended to 80 years.[15] This process has not identified anything which could not be addressed in the initial licensing.

Twenty additional years would provide further certainty to projects, increasing the overall benefits, and would avoid an additional licensing process for life extension to 60 years. Many reactor designers also are designing their reactors to have a 60-year or longer design lifetime.[16] A 60-year initial licensing

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9 42 U.S.C. § 2133(c); *see also* 10 C.F.R. § 50.51(a) ("Except as noted in § 50.51(c), each license will be issued for a fixed period of time to be specified in the license but in no case to exceed 40 years from date of issuance.").

10 42 U.S.C. § 2133(c).

11 10 C.F.R. § 54.31(b).

12 10 C.F.R. § 54.31(d).

13 NUREG-1850, Frequently Asked Questions on License Renewal of Nuclear Power Reactors (Mar. 2006), *available at* https://www.nrc.gov/docs/ML0611/ML061110022.pdf.

14 *See* Status of Initial License Renewal Applications and Industry Initiatives, https://www.nrc.gov/reactors/operating/licensing/renewal/applications.html.

15 *See* Status of Subsequent License Renewal Applications, https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html.

16 *See, e.g.*, Westinghouse, Improved Nuclear Power Plant Operations (stating a 60-year design lifetime for the AP1000), https://westinghousenuclear.com/energy-systems/ap1000-pwr/operations-and-maintenance/; NuScale Plant Design Overview, RP-1114-9375, Rev. 0 (Nov. 7, 2014) (stating a 60-year design plant life for the NuScale plant), *available at* https://www.nrc.gov/docs/ML1432/ML14329B308.pdf; GE-Hitachi, BWRX-300 Small Modular Reactor (stating a design life for the BWRX-300 of 60 years), https://www.gevernova.com/nuclear/carbon-free-power/bwrx-300-small-modular-

term should not be a mandatory requirement as it may add further cost to NRC applicants to analyze their proposed reactor designs and to consider aging management. This change, however, could substantially improve the value of a commercial nuclear power plant project, potentially resulting in more projects being pursued.

3.1.2. Clarify NRC Authority to License Away-from-Reactor Spent Fuel Storage Facilities

- *Recommendation: Address recent court decision in which the U.S. Court of Appeals for the Fifth Circuit ruled, contrary to other Federal appellate courts and legislative text, that the NRC does not have the authority to license away-from-reactor spent fuel storage facilities.*
- *Status: New recommendation.*
- *Implementation: Requires legislative change.*

The Nuclear Waste Policy Act of 1982 (NWPA) directs the disposal of spent nuclear fuel in a deep geologic repository. For many reasons, the licensing and construction of such a repository has been delayed significantly. Interim storage of the spent nuclear fuel provides an interim solution until such a repository is available or an alternative approach is codified. This interim storage may occur at the location where the spent nuclear fuel is generated, but the flexibility for away-from-reactor storage of the spent nuclear fuel provides an important option for the nation. Some benefits include consolidation of dispersed spent nuclear fuel in one location; closure of decommissioned reactor sites that only have spent nuclear fuel remaining; and potential reduction in cost due to efficiencies in scale of an interim facility.

In a 2023 court decision, the U.S. Court of Appeals for the Fifth Circuit vacated the license issued by the NRC to Interim Storage Partners, LLC (ISP) for a consolidated interim storage facility for spent nuclear fuel in Andrews County, Texas.[17] The Fifth Circuit ruled that the NRC has no statutory authority to license a private, away-from-reactor storage facility for spent nuclear fuel.[18] The Fifth Circuit concluded that the AEA only authorizes the NRC to issue materials licenses for "certain enumerated purposes—none of which encompass storage or disposal of material as radioactive as spent nuclear fuel."[19] The Fifth Circuit also concluded that arguments regarding NRC authority to license such facilities cannot be reconciled with the NWPA, which the Court claimed provided a comprehensive statutory scheme for addressing spent nuclear fuel and does not address such interim facilities.[20] Following this decision, the Fifth Circuit also vacated an NRC license issued to Holtec International for a similar spent nuclear fuel interim storage facility in Lea County, New Mexico.[21]

Both the NRC and ISP have appealed the Fifth Circuit ISP decision to the U.S. Supreme Court, and the Nuclear Energy Institute has filed an *Amicus Curiae* brief in support of overturning the decision. They make many arguments for why the Fifth Circuit decision is incorrect and the NRC has statutory authority to license away-from-reactor spent nuclear fuel storage facilities. These include the plain language of the AEA permits NRC licensing of such facilities; the decision is contrary to longstanding practice; the Court misread the AEA; the NWPA did not repeal or limit the AEA authority; and the decision conflicts with earlier decisions of the D.C. and Tenth Circuits.[22]

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reactor; TerraPower, Natrium (stating an operational lifespan of the Natrium reactor of up to 80 years), https://www.terrapower.com/downloads/Natrium_Technology.pdf.

17 *Texas v. NRC*, 78 F.4th 827 (5th Cir. 2023), *denying rehearing en banc*, 95 F.4th 935 (5th Cir. 2024).

18 *Id.* at 840-44.

19 *Id.* at 840-42.

20 *Id.* at 842-44.

21 *Fasken Land and Minerals, Ltd. v. NRC*, Case No. 23-60377 (5th Cir., Mar. 27, 2024) (unpublished).

22 *See Bullcreek v. NRC*, 359 F.3d 536, 542 (D.C. Cir. 2004) (concluding that the AEA authorized the NRC to license offsite storage of spent fuel and the NWPA did not repeal or supersede that authority); *Skull Valley Band of Goshute Indians v.*

Although the Fifth Circuit's new interpretations of NRC licensing could be resolved on appeal to the Supreme Court, they may not. For example, the Supreme Court could rule on the appeal on other grounds, such as jurisdictional issues raised about the manner in which these issues were appealed to the Fifth Circuit. Any such outcome presents uncertainty about this important tool for addressing interim storage of spent nuclear fuel. Additionally, if the Supreme Court were to uphold the Fifth Circuit, then it would eliminate the ability for away-from-reactor interim storage of spent nuclear fuel.

Without taking a position on the merits of the Fifth Circuit decision or the appeals, Congress could uphold the ability of the nuclear industry to employ this important storage tool of away-from-reactor interim storage facilities. Specifically, Congress could affirmatively state in the AEA or NWPA that the NRC has the authority to license away-from-reactor spent nuclear fuel storage facilities, notwithstanding any other laws. This would moot the Fifth Circuit decision and provide stability on this topic.

3.1.3. Clarify DOE Authority for Non-Commercial Demonstration Reactor Projects

- *Recommendation: Allow DOE to authorize any non-commercial demonstration nuclear reactor projects with no exceptions.*
- *Status: Revised from Recommendation 2.3.2 in April 2023 Report.*
- *Implementation: Requires legislative change.*

AEA Section 110 states: "Nothing in this subchapter shall be deemed a. to require a license for . . . (2) the construction or operation of facilities under contract with and for the account of the Commission . . . ."[23] Although this provision mentions the "Commission," which originally was a reference to the Atomic Energy Commission (AEC), the courts have confirmed that Commission in this provision now must be read to include DOE.[24] Therefore, the starting position is that construction and operation of nuclear facilities under contract with and for the account of DOE do not need an NRC license, and can therefore proceed under DOE authorization. In the legislative history for the Energy Reorganization Act of 1974, as amended (ERA), Congress further recognized DOE authorization for nuclear R&D by stating that Energy Research and Development Administration (ERDA)/DOE self-regulation is "especially imperative in the noncommercial nuclear R. & D. area because the [NRC] will have no licensing jurisdiction over such [] nuclear activities."[25]

Some exceptions exist to the above starting position in AEA Section 110. ERA Section 202 identifies specific types of facilities which are subject to NRC licensing and related regulatory authority, notwithstanding AEA Section 110.[26] Of most relevance here, those facilities include: "(2) Other demonstration nuclear reactors—except those in existence on the effective date of this Act—when operated as part of the power generation facilities of an electric utility system, or when operated in any

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Nielson, 376 F.3d 1223, 1232 (10th Cir. 2004), *cert. denied*, 546 U.S. 1060 (2005) (agreeing that the AEA "authorizes the NRC to license privately-owned, away-from-reactor storage facilities," and that the NWPA did not restrict the agency's exercise of that power).

23 42 U.S.C. § 2140.

24 *See, e.g.*, *Waste Control Specialists, LLC v. DOE*, 141 F.3d 564, 567 n.16 (5th Cir. 1998) ("42 U.S.C. § 2140(a). 'Commission' refers to the Atomic Energy Commission. 42 U.S.C. § 2014(f). The district court found that Commission also applied to the DOE, and DOE does not disagree with that."); *Waste Control Specialists, LLC v. DOE*, 1997 U.D. dist. LEXIS 19717 (N.D. Tx. 1997) ("The Atomic Energy Commission was abolished in 1974 and its functions were transferred to the NRC and [ERDA]. In 1977, Congress terminated [ERDA] and transferred its functions to the newly-created DOE. As a result, the reference to 'Commission' in Section 110a.(2) of the AEA must be read to refer to the DOE."); *see also* Congressional Research Service Memorandum from Todd Garvey, Legislative Attorney, to Aaron Weston, House Committee on Science, Space and Technology, NRC Licensing of Proposed DOE Nuclear Facilities, at 2 n.9 (July 20, 2015), *available at* https://docs.house.gov/meetings/SY/SY20/20150729/103833/HHRG-114-SY20-20150729-SD009.pdf.

25 Senate Report No. 93-980, 93th Cong., 2nd Sess. 1974, 1974 U.S.C.C.A.N 5470, 5492 (June 27, 1974).

26 42 U.S.C. § 5842.

other manner for the purpose of demonstrating the suitability for commercial application of such a reactor." Therefore, if a reactor is a "demonstration" reactor and either (1) is operated as part of the power generation facilities of an electric utility (i.e., places power on the commercial grid); or (2) is operated to demonstrate the "suitability for commercial application," then it typically must be NRC licensed.

As discussed in the 2023 Report,[27] although the first part of this ERA Section 202 exception ("operated as part of the power generation facilities of an electric utility") draws a fairly clear line for NRC licensing, the second part of the exception has presented some confusion due to the lack of definition of "demonstrating the suitability for commercial application." For example, one could argue that almost any demonstration project with a private company proponent is being pursued as part of commercial application. On the other hand, prior to demonstrating suitability for commercial application, even private sector companies may have many research, experimental, analysis, and operational characteristics to demonstrate, test, and understand, that come long before commercial suitability. This has raised questions about whether projects should require an NRC license. This confusion has the potential to cause significant delay awaiting NRC licensing. It also may prohibit projects given the potential regulatory conflicts for individual facilities having both NRC licensed and DOE authorized projects.

Consistent with AEA Section 110, projects constructed and operated under contract with and for the account of DOE, even if they are the intended commercial design, and which do not sell commercial power or any other commercial product (e.g., heat, hydrogen) should be allowed to proceed under DOE authorization rather than NRC licensing. There is no incentive for a private company to pursue a project at a National Laboratory site, for example, without selling power or another commercial product, unless the project is needed for an R&D purpose. The cost simply would not be justified. Requiring an NRC license under these conditions would add significant cost and time not appropriate for those projects. The likely outcome is that the projects will avoid DOE R&D and move directly to commercial licensing at the NRC, which may itself result in more time, expense, and uncertainty.

The preferred approach is to delete the "Other demonstration nuclear reactors" exception in ERA Section 202 in its entirety. Projects would then look to AEA Section 110 to determine if they are "under contract with and for the account of" DOE. If so, then these projects could be DOE authorized. The phrase "under contract with and for the account of" DOE also should be clarified to include projects operated by a DOE contractor. Alternatively, the ERA Section 202 exception could be modified to clarify that the NRC has licensing jurisdiction for DOE projects only for reactors that commercially sell electricity or another commercial product to an entity other than DOE. This modification would remove the uncertainty for non-commercial projects on DOE sites.

3.1.4. Allow DOE to Authorize Commercial Nuclear Reactor Projects on Federal Lands

- *Recommendation: Broaden DOE's statutory authority to allow it to authorize construction and operation of commercial nuclear reactor projects on Federal lands.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change.*

As noted above, DOE has significant authority to authorize the construction and operation of certain reactors under contract with and for the account of DOE.[28] This authority, however, has limits and typically would not cover the authorization of commercial reactors not under contract with and for the

[27] 2023 Report at 20-22.

[28] 42 U.S.C. § 2140.

account of DOE. In general, the NRC has licensing authority for commercial reactors placing power on the commercial grid.

This situation significantly limits the flexibility of new reactor proponents to engage with DOE on their commercial projects. Many new reactor companies have expressed interest in pursuing a DOE authorization process over NRC licensing given the perceived simplicity and close engagement through DOE's process. This process is viewed as being much shorter and more straightforward than NRC's licensing process. This is particularly true for projects with new designs and for which significant testing or operations data are not available. DOE also has substantial experience with reactor authorizations. At INL, for example, DOE (and its predecessor agencies) has authorized 52 reactors and is in the process of authorizing more.

The need for more nuclear power generation is great. This has been confirmed in executive orders issued by this Administration, including Executive Order 14154, Unleashing American Energy,[29] and Executive Order 14156, Declaring a National Energy Emergency.[30] This need is immediate for nuclear generation on Federal lands to support the power demands for data centers for Artificial Intelligence (AI). Executive Order 14179, Removing Barriers to American Leadership in Artificial Intelligence, confirms that "[i]t is the policy of the United States to sustain and enhance America's global AI dominance in order to promote human flourishing, economic competitiveness, and national security."[31] As one example of implementing this policy, DOE recently issued a request for information to explore "opportunities to leverage its land assets to support the growing demand for AI infrastructure."[32] DOE states in this request that it seeks to enable construction of AI infrastructure at DOE sites to begin by the end of 2025 with operations by the end of 2027. Based on recent experience, these goals are inconsistent with NRC licensing timeframes.

For these reasons, DOE should be allowed to authorize commercial nuclear reactor projects on Federal lands. This will utilize DOE's longstanding experience with reactor authorizations to meet the nation's goals for energy security and dominance. This approach will support AI development by powering data centers with nuclear power, utilization of nuclear power for defense purposes, and many other commercial activities. Limiting this authority to Federal lands will help ensure a connection to the Government and a clear geographic line between where DOE authorization is permitted and NRC licensing is required.

Implementation of this change may require changes to the AEA (e.g., AEA Section 110) and perhaps the ERA (e.g., ERA Section 202). This change should apply both to projects (1) seeking R&D on Federal lands without commercial activities, and then transitioning to commercial activities; and (2) performing commercial activities on Federal lands at the outset.

Although the above broader change is preferred, a more limited change would be to allow DOE to authorize first-of-a-kind reactors for a set amount of time on Federal lands. Under this scenario, authorization for the initial up to 10 years of operation and then transitioning to NRC oversight would be appropriate. This would allow reliance on the efficiencies of DOE authorization in a first-of-a-kind environment. This also would require changes to the AEA and perhaps the ERA. With this

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[29] Executive Order 14154, Unleashing American Energy, 90 Fed. Reg. 8353 (Jan. 29, 2025) ("It is the policy of the United States . . . to protect the United State's economic and national security and military preparedness by ensuring that an abundant supply of reliable energy is readily accessible in every State and territory of the Nation.").

[30] Executive Order 14156, Declaring a National Energy Emergency, 90 Fed. Reg. 8433 (Jan. 29, 2025) ("The energy . . . generation capacity of the United States are all far too inadequate to meet our Nation's needs.").

[31] Executive Order 14179, Removing Barriers to American Leadership in Artificial Intelligence, 90 Fed. Reg. 8741 (Jan. 31, 2025).

[32] Request for Information on Artificial Intelligence Infrastructure on DOE Lands, 90 Fed. Reg. 14,972 (Apr. 7, 2025).

recommendation, it is important that the NRC accept the DOE authorization process and does not re-review issues once the regulatory authority transitions.

3.1.5. Clarify that DOE Does Not Require NRC Approval to Authorize DOE Nuclear Activities Away from U.S. Government-Owned or Controlled Sites

- *Recommendation: Clarify that DOE may authorize offsite DOE activities for which it has statutory authority, including activities not located on Government-owned and controlled sites, without any NRC approval.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change or NRC rulemaking.*

In its regulations for various nuclear materials and nuclear reactors, the NRC has implemented rules to exclude certain persons using those materials and reactors under DOE contracts from the requirement to obtain an NRC license. For example, 10 C.F.R. Part 30 addresses NRC licenses for the use of byproduct material. 10 C.F.R. § 30.12 states in relevant part (emphasis added):

> Except to the extent that Department facilities or activities of the types subject to licensing pursuant to section 202 of the Energy Reorganization Act of 1974 are involved, *any prime contractor of the Department is exempt* from the requirements for a license set forth in sections 81 and 82 of the Act and from the regulations in this part to the extent that such contractor, *under his prime contract with the Department manufactures, produces, transfers, receives, acquires, owns, possesses, or uses byproduct material for*:
>
> (a) *The performance of work for the Department at a United States Government-owned or controlled site*, including the transportation of byproduct material to or from such site and the performance of contract services during temporary interruptions of such transportation; . . .
>
> In addition to the foregoing exemptions and subject to the requirement for licensing of Department facilities and activities pursuant to section 202 of the Energy Reorganization Act of 1974, *any prime contractor or subcontractor of the Department or the Commission is exempt* from the requirements for a license set forth in sections 81 and 82 of the Act and from the regulations in this part to the extent that such prime contractor or subcontractor manufacturers, produces, transfers, receives, acquires, owns, possesses, or uses byproduct material under his prime contract or subcontract *when the Commission determines that the exemption of the prime contractor or subcontractor is authorized by law; and that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety*.

To summarize, this regulation generally provides an *automatic exemption* to a DOE contractor from the requirement for an NRC license for byproduct material if the work is performed under a prime contract with DOE and is performed "at a United States Government-owned or controlled site," including transportation of the byproduct material to or from such site. The contractor can also seek a *discretionary exemption* from the Commission as long as it meets the specified standards. The NRC adopted similar regulations for prime contractors working with source material (10 C.F.R. § 40.11), special nuclear material (10 C.F.R. § 70.11), and reactors (10 C.F.R. § 50.11).

In each of these regulations, the NRC has included a limitation for the automatic exemption that the use of the nuclear material or nuclear reactor is for "The performance of work for [DOE] at a United

States Government-owned or controlled site." This limitation for U.S. Government-owned or controlled sites does not appear to be included in statutory language. For example, with respect to nuclear reactors, AEA Section 110 states: "Nothing in this subchapter shall be deemed a. to require a license for . . . (2) the construction or operation of facilities under contract with and for the account of [DOE] . . . ."[33] There is no limitation that this provision only applies if on a U.S. Government-owned or controlled site.

For these reasons, the above NRC regulations should be modified to remove this limitation. It unnecessarily requires offsite DOE projects to engage with the NRC, including requests for exemptions in some circumstances. This decreases efficiencies, including additional cost and paperwork, and imposes upon DOE's jurisdiction. It also has the potential to delay DOE activities. This limitation could be remedied through a statutory clarification of DOE's authority, thereby requiring the NRC to make a conforming change to its regulations, or directly by the NRC through its own rulemaking to modify the above regulations.

[33] 42 U.S.C. § 2140.

3.2. Reforms to Streamline NRC Hearings

3.2.1. Eliminate Mandatory Hearing Requirement

- *Recommendation: Remove the requirement in the AEA for the NRC to hold an uncontested "mandatory hearing" for new reactor licensing actions, saving months from the critical path for those actions.*
- *Status: Revised from Recommendation 2.1.1 in April 2023 Report.*
- *Implementation: Requires legislative change.*

The AEA requires that the NRC hold a "mandatory hearing" for certain types of licensing activities. Specifically, AEA Section 189a.(1)(A) states: "The Commission shall hold a hearing after thirty days' notice and publication once in the Federal Register, on each application under section 103 or 104b. for a construction permit for a facility, and on any application under section 104c. for a construction permit for a testing facility."[34] This means that the Commission must hold a mandatory hearing for each Construction Permit (CP) under 10 C.F.R. Part 50; each Limited Work Authorization (LWA) under 10 C.F.R. Part 50; each Early Site Permit (ESP), which is considered a partial CP, under 10 C.F.R. Part 52; and each Combined License (COL), which includes a CP and Operating License (OL), under 10 C.F.R. Part 52.

A mandatory hearing is a non-contested proceeding in which only the applicant and the NRC Staff participate. The Commission is the presiding officer or delegates the responsibility. The mandatory hearing process commences once the NRC Staff completes its review (i.e., issues final Safety Evaluation Report (SER) or Environmental Impact Statement (EIS), whichever is later) and publishes a SECY information paper to the Commission describing its review. The process may include written questions and responses, written testimony, etc. The process concludes with a decision by the presiding officer.

Because the mandatory hearing process does not begin until the NRC Staff completes its review (and is ready to issue the permit/license), the process is squarely on the critical path for the licensing action. INL reviewed past mandatory hearings from 2009 through 2023 and determined that they have taken 4-7 months to complete (most frequently 6 months), directly adding this delay to the licensing action.[35]

Based on its review, INL concluded that the mandatory hearings serve little purpose for the following reasons: applications undergo thousands of hours of detailed review by many NRC Staff reviewers with substantial subject matter expertise; the ACRS also reviews safety issues in these applications; the applications are subject to a contested hearing opportunity; the applications are subject to numerous public meetings and opportunities for public comment; and none of the mandatory hearings reached a different conclusion from the NRC Staff on the findings to support the licensing action.[36] For these reasons, INL concluded that the mandatory hearing process has outlived its original purpose and should be removed from the AEA.[37]

The Center on Global Energy Policy at Columbia University also reviewed this topic and concluded that "Congress should eliminate the mandatory hearing in Section 189a of the AEA."[38] Some of the reasons for the recommendation were the original needs for mandatory hearings have "clearly passed" and are "no longer relevant"; the licensing process is much more transparent now; the Commission can

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[34] 42 U.S.C. § 2239(a)(1)(A).

[35] 2023 Report at 3-5.

[36] *Id.* at 5-6.

[37] *Id.* at 6.

[38] Improving the Efficiency of NRC Power Reactor Licensing: The 1957 Mandatory Hearing Reconsidered, at 39 (Nov. 2023), *available at* https://www.energypolicy.columbia.edu/publications/improving-the-efficiency-of-nrc-power-reactor-licensing-the-1957-mandatory-hearing-reconsidered/.

address any benefits through other means; and there are other avenues for public education and participation.[39] INL agrees that these reasons further support elimination of the mandatory hearing.[40]

The NRC has recently made some improvements to the mandatory hearing process. In response to a tasking memorandum, the NRC's General Counsel submitted a paper to the Commission with a variety of options to streamline the mandatory hearing process.[41] The Commission subsequently approved the use of an option utilizing written materials without an oral hearing.[42] This new process was used for the mandatory hearing for the Kairos Hermes 2 CP.[43] This resulted in a delay between issuance of the final NRC staff review document (Aug. 30, 2024) and issuance of the CP (Nov. 21, 2024) of just under three months.[44] Although this is an improvement over past mandatory hearings, the mandatory hearing requirement still imposes unnecessary delay to these licensing proceedings. The NRC's approach also can change over time and will be dependent on the Commission composition. Only a legislative removal will fully address this issue.[45]

Both houses of Congress have a pending bill titled, "Efficient Nuclear Licensing Hearings Act" (H.R.6464, S.4288). Among other things, the bill would remove the mandatory hearing requirement for reactor licensing. If passed, this bill would address the concerns with mandatory hearing delays described above.

3.2.2. Simplify Contested Hearing Process

- *Recommendation: Require use of a simplified hearing process for NRC contested new reactor licensing proceedings, instead of the existing lengthy and costly hearing procedures.*
- *Status: Same as Recommendation 2.1.3 in April 2023 Report.*
- *Implementation: Requires legislative change or NRC rulemaking.*

The AEA requires the opportunity for contested hearings on new reactor applications, but does not provide much direction for how the NRC is to conduct contested hearings. AEA Section 189a.(1)(A) broadly states: "In any proceeding under this Act, for the granting . . . of any license or construction permit . . ., the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding, and shall admit any such person as a party to such proceeding."[46] This lack of statutory direction has provided much discretion to the NRC to develop its hearing procedures.

The NRC's rules of practice and procedure governing the conduct of most NRC hearings, including those addressing new reactors, are found in 10 C.F.R. Part 2. The contested hearing process for new reactors typically commences with the NRC publishing a notice of opportunity to request a hearing or petition for leave to intervene in the *Federal Register* either at the time of docketing an application or

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39 *See id.* at 37-39.

40 *See also* BPC 2024 Report, at 10 (recommending elimination of the uncontested mandatory hearing from the licensing process for new reactors).

41 *See* SECY-24-0032, Revisiting the Mandatory Hearing Process at the U.S. Nuclear Regulatory Commission (Apr. 12, 2024), *available at* https://www.nrc.gov/docs/ML2410/ML24103A090.pdf.

42 *See* Staff Requirements – SECY-24-0032 – Revisiting the Mandatory Hearing Process at the U.S. Nuclear Regulatory Commission (July 18, 2024), *available at* https://www.nrc.gov/docs/ML2420/ML24200A044.pdf.

43 *See Kairos Power LLC* (Hermes 2 Test Reactor Facility), CLI-24-03, 100 NRC __, slip op. at 3-4 (Nov. 20, 2024), *available at* https://www.nrc.gov/docs/ML2432/ML24325A378.pdf.

44 *See* Hermes 2 – Kairos Application, https://www.nrc.gov/reactors/non-power/new-facility-licensing/hermes2-kairos.html.

45 Even the NRC itself has either recommended that the mandatory hearing requirement be eliminated, or stated that the mandatory hearings are unnecessary. *See, e.g.*, Transcript, House Subcommittee on Energy, Climate, and Grid Security, Committee on Energy and Commerce, American Nuclear Energy Expansion: Updating Policies for Efficient, Predictable Licensing and Deployment, at 79-82 (July 18, 2023), *available at* https://docs.house.gov/meetings/IF/IF03/20230718/116255/HHRG-118-IF03-Transcript-20230718.pdf.

46 42 U.S.C. § 2239(a)(1)(A).

shortly thereafter. Subpart C of Part 2 provides the rules of general applicability and covers many topics such as hearing requests, presiding officer powers, and general hearing management. If a hearing request is granted, then 10 C.F.R. § 2.310 addresses the selection of hearing procedures and directs that most proceedings for the grant of licenses or permits under 10 C.F.R. Parts 50 and 52 should proceed under 10 C.F.R. Part 2, Subpart L (Simplified Hearing Procedures for NRC Adjudications).

Notwithstanding the title of "Simplified Hearing Procedures," the use of Subpart L commences a hearing process which can be very complicated and require significant effort, cost, and time. Some of the features of Subpart L include the following:

- The NRC Staff must prepare and file the "hearing file," which includes the application, amendments, NRC EIS, and any correspondence between the applicant and the NRC *relevant to the admitted contention*.[47] Depending on the subject of the hearing, the hearing file can be very extensive. As a fairly recent example, the initial hearing file in the Clinch River ESP proceeding identified 432 documents, representing many thousands of pages of documents.[48]
- The applicant and parties other than the NRC Staff must file their "mandatory disclosures," including information on experts, list of privileged or protected documents, and "[a] copy (for which there is no claim of privilege or protected status), or a description by category and location, of all tangible things (e.g., books, publications and treatises) in the possession, custody or control of the party that are *relevant to the contention*."[49] Depending on the subject of the hearing, the mandatory disclosures can be very extensive. As one example, the applicant's initial mandatory disclosures in the North Anna COL proceeding identified 880 documents, also representing many thousands of pages of documents.[50]
- The above disclosure requirements are continuing and must be updated monthly.[51]
- The parties may prepare and respond to motions related to the proceeding, including motions for summary disposition.[52]
- The parties may file new or amended contentions throughout the NRC review, which if admitted, may multiply the hearing burdens.[53]
- The parties must prepare and submit numerous hearing documents, including written statements of position, written testimony with supporting affidavits, written responses and rebuttal testimony with supporting affidavits, proposed questions for the presiding officer to consider for propounding to the persons sponsoring the testimony, and post-hearing proposed findings of fact and conclusions of law.[54]
- The parties typically must prepare for and participate in oral hearings with the presiding officer.[55]
- The parties may then appeal decisions to the Commission first and then to the Federal courts.[56]

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47 10 C.F.R. §§ 2.336(b), 2.1203.

48 Letter from K. Roach, NRC Staff Counsel, to Administrative Judges (Dec. 15, 2017), *available at* https://www.nrc.gov/docs/ML1734/ML17349A992.pdf.

49 10 C.F.R. § 2.336(a) (emphasis added).

50 Production Log for Dominion's Initial Disclosures (Oct. 1, 2008), *available at* https://www.nrc.gov/docs/ML0827/ML082750602.pdf.

51 10 C.F.R. § 2.336(d).

52 10 C.F.R. §§ 2.1204, 2.1205.

53 10 C.F.R. § 2.309(c).

54 10 C.F.R. §§ 2.1207(a), 2.1210.

55 10 C.F.R. § 2.1207(b).

56 10 C.F.R. § 2.1212.

Some of the above activities related to the hearing file, discovery, and motions practice may occur in parallel with the NRC's application review. The filings and preparation leading to the oral hearing, however, typically would not begin until the NRC Staff completes either its draft safety evaluation for relevant safety topics or the Final EIS for environmental topics.[57] This timing could result in a contested hearing process which coincides with the critical path for the licensing action. The timeline for the hearing process from the Staff completion of the triggering document could take a year or more until the presiding officer issues a decision on the hearing.

Any reduction of the level of effort and timeframes related to contested proceedings would be a significant benefit to new reactor applications, particularly changes related to document discovery and the timeframes of the hearing. One option would direct new reactor hearings to utilize a legislative hearing process rather than the Subpart L process. NRC's rules at 10 C.F.R. Part 2, Subpart O already provide for "Legislative Hearings" for certain activities. These hearings are intended to be simplified with less discovery, simpler paper filings, and a limited oral hearing. As explained in Subpart O, these proceedings would involve written statements on Commission-identified issues, may include documentary and demonstrative information, and would include an oral hearing with the presiding officer questioning witnesses.[58] The timeframes in Subpart O contemplate a very expedited process which could be completed in a few months, rather than the year plus which could be required for a Subpart L proceeding. To further limit the impact of the hearing on the licensing action, it is recommended that the Commission commence legislative hearings on topics during the NRC Staff's review rather than awaiting conclusion of the review. Some changes to Subpart O would be required to conform with this recommendation, such as broadening the scope to include new reactor proceedings and changes to make it clear that mandatory disclosures and the hearing file would not be required.

Both houses of Congress have a pending bill titled, "Efficient Nuclear Licensing Hearings Act" (H.R.6464, S.4288). The bill directs that "informal adjudicatory procedures" be used for any contested hearings. This should address the intent of the recommendation.

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57 10 C.F.R. § 2.332(d).

58 *See* 10 C.F.R. §§ 2.1506, 2.1507.

3.3. Reforms to Expedite Environmental Reviews

3.3.1. Eliminate NEPA Reviews for New Nuclear Projects

- *Recommendation: Given the importance of new nuclear reactors, eliminate the requirement to perform NEPA reviews for all new nuclear projects and related activities, whether under the jurisdiction of NRC or DOE.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change.*

One of the most significant costs and burdens of new reactor licensing projects is compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA),[59] which generally requires environmental review of Federal actions. The Center on Global Energy Policy at Columbia University recently issued a report on improving the efficiency of the environmental reviews for power reactor licensing.[60] Among other things, the report compiled the NRC's assessment of environmental impacts for the construction and operation of new reactors for the COLs issued to date by the NRC.[61] Of note, the summary did not show any "Large" detrimental impacts for any of the projects and a relatively small number of "Small to Moderate" or "Moderate" impacts.[62] Most of the impacts were determined to be "Small." Based on this review, the report concluded:

> Meanwhile, in no case from the license proceedings in the 2000s or 2010s did the NRC find that a new reactor project would create large (i.e., destabilizing) adverse impacts—for either a brownfield or a greenfield host site. The moderate adverse impacts on resource categories typically came from unavoidable elements such as new transmission lines and traffic, while positive (and in some cases "large") impacts always came in the form of jobs and taxes. A decarbonization effort by midcentury to avoid potentially destabilizing impacts from climate change, regardless of the technology pathway used, will involve many new transmission lines and lots of new power plant construction (and associated traffic and jobs), so none of these commonalities is a reason not to deploy new nuclear power. Indeed, one of nuclear power's valuable attributes is that it requires less land and fewer new transmission lines per megawatt hour generated compared with much higher renewable energy scenarios.[63]

Given this precedent and the low likelihood of any significant impacts from new reactor construction and operation, combined with the need for energy expansion and energy security provided by new nuclear reactors, Congress should exclude new nuclear projects from the requirements of NEPA. Removing the NEPA requirements for these projects would significantly improve the ability for the nuclear industry to deliver new nuclear projects in a timely fashion.

Furthermore, even absent NEPA, the projects still would need to comply with many other environmental requirements, which should address any realistic potential environmental impacts. This is

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59 42 U.S.C. § 4321 et seq.

60 *See* Improving the Efficiency of NRC Power Reactor Licensing: Environmental Reviews (Jan. 2025), *available at* https://www.energypolicy.columbia.edu/wp-content/uploads/2025/01/NEPA-CGEP_Report_012225-2.pdf.

61 *Id.*, Appendix.

62 These categories were defined as follows based on terminology used by the NRC: "Small: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource." "Moderate: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource." "Large: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource." *Id.* at 24-25.

63 *Id.* at 40 (footnotes omitted).

illustrated by the NRC's efforts related to preparation of a Generic Environmental Impact Statement for new nuclear licensing (NR GEIS).[64] Specifically, Appendix F of the draft NR GEIS identifies other laws, regulations, and other authorizations that may apply to licensing a new reactor.[65] Appendix F identifies 36 potential Federal laws and regulations, such as the Clean Air Act, Clean Water Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, etc.[66] It also identifies 17 potential Executive Orders, and more have been issued since this list was prepared.[67] It further identifies NRC regulations and guidance; State laws, regulations, and other requirements; State environmental requirements, including 25 potential laws or regulations; operating permits and other requirements, including 24 examples; and many emergency management requirements.[68]

Simply put, NEPA is not the only environmental law applicable to new nuclear projects. These other laws will ensure that any potential environmental impacts are appropriately addressed. Any NEPA topics which may not be covered (e.g., cumulative impacts, alternative sites) either would be well understood or are simply unnecessary. This is supported by recent discussion of the "regulated impacts" principle, arguing that issues which are addressed by other environmental laws should not have to be considered during NEPA reviews.[69]

There is some precedent for Congress excluding certain Federal activities from NEPA requirements. One example is rebuilding assistance provided by the Department of Homeland Security's Federal Emergency Management Agency (FEMA), which is excluded from NEPA by the Stafford Act (42 U.S.C. § 5159). The Congressional Research Service describes the statutory exemption as follows:

> In responding to emergencies and major disasters, existing provisions of the Stafford Act statutorily exempt certain FEMA-funded activities from NEPA. Statutory exclusions generally apply to actions that are emergency in nature or are necessary for the preservation of life and property. They apply to most Public Assistance actions funded by FEMA, but do not apply to hazard mitigation, flood mitigation, unmet needs projects, or FEMA grant programs.[70]

The statutory exemption includes actions related to general Federal assistance; essential Federal assistance; repair, restoration, and replacement of damaged buildings; debris removal; and Federal emergency assistance.[71] Similar to this example related to rebuilding assistance after an emergency, the basis for excluding new reactor projects from NEPA would be the need to rapidly construct reactors given their important benefits to the nation. This recommendation is applicable whether a project is subject to DOE authorization or NRC licensing.

3.3.2. Exclude Non-Commercial Reactors on DOE Sites from NEPA

- *Recommendation: Exclude non-commercial reactor projects on DOE sites from NEPA, whether subject to DOE authorization or NRC licensing.*

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64 New Nuclear Reactor Generic Environmental Impact Statement (NR GEIS), https://www.nrc.gov/reactors/new-reactors/advanced/modernizing/rulemaking/advanced-reactor-generic-environmental-impact-statement-geis.html.

65 NUREG-2249, Draft Generic Environmental Impact Statement for Licensing of New Nuclear Reactors (Sept. 2024), *available at* https://www.nrc.gov/docs/ML2417/ML24176A220.pdf.

66 *Id.*, App. F, at F-1 to F-10.

67 *Id.*, App. F, at F-10 to F-13.

68 *Id.*, App. F, at F-13 to F-24.

69 *A Simple Way to Cut NEPA's Red Tape* (Dec. 9, 2024), https://www.wsj.com/opinion/a-simple-way-to-cut-nepas-red-tape-environmental-laws-supreme-court-38e7f6fd?st=6aVCa7.

70 Implementing the National Environmental Policy Act (NEPA) for Disaster Response, Recovery, and Mitigation Projects, at 7 (Aug. 31, 2017), *available at* https://crsreports.congress.gov/product/pdf/RL/RL34650.

71 *Id.* at 7-8.

- *Status: Revised from Recommendation 2.2.4 in April 2023 Report.*
- *Implementation: Requires legislative change.*

If the above recommendation to eliminate NEPA reviews for new reactors is not adopted, Congress could pursue exclusion of a subset of reactors from NEPA. In addition to the minimal environmental impacts of new reactors discussed in the prior recommendation, as discussed in INL's 2023 Report, recent experience with NEPA reviews for reactors at INL has shown very low potential environmental impacts under these scenarios.[72] This includes the Environmental Assessment for the Microreactor Applications Research, Validation, and Evaluation (MARVEL) project.[73] DOE concluded: "Implementing the MARVEL microreactor would result in small adverse impacts to the environment. However, these impacts, in conjunction with other past, present, and reasonably foreseeable future actions, would not result in discernible cumulative impacts."[74]

As another example, in February 2022, DOE and the Department of Defense Strategic Capabilities Office issued an EIS for Project Pele to construct and demonstrate a prototype mobile microreactor.[75] The agencies concluded: "The impacts of Project Pele activities . . . would be a small fraction of the impacts of current operations . . . and would be an even smaller fraction when the impacts from other reasonably foreseeable actions are considered . . . . Therefore, . . . the incremental impacts for all resource areas from Project Pele activities would be very small and would not substantially contribute to cumulative impacts."[76]

An even more recent example from 2023 is the Environmental Assessment for the Molten Chloride Reactor Experiment (MCRE) project at INL.[77] DOE concluded: "based on the analysis provided in this document, it is anticipated that any potential impact would not significantly affect the quality of the human environment."[78]

Finally, DOE's February 2014 Environmental Assessment for the resumption of operation of the Transient Reactor Test Facility (TREAT) reactor at INL provides another example.[79] This reactor provides short bursts of intense, high-power radiation and had been in standby status since 1994.[80] DOE concluded that the potential impacts from restarting the TREAT reactor would be small,[81] and the reactor was later returned to service.

Given the low likelihood of any significant impacts and the need for fast progression of advanced reactor development, non-commercial reactor projects on existing DOE sites should be statutorily excluded from the requirements of NEPA. A limitation for non-commercial reactor projects on DOE sites

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72 2023 Report at 14-15.

73 Final Environmental Assessment for the Microreactor Applications Research, Validation, and Evaluation (MARVEL) Project at Idaho National Laboratory, DOE/EA-2146 (June 2021), *available at* https://www.id.energy.gov/insideNEID/PDF/DOE%20EA-2146%20Final%20Environmental%20Assessment%20for%20the%20MARVEL%20Project%20at%20INL.pdf.

74 *Id.* at 51.

75 Construction and Demonstration of a Prototype Mobile Microreactor Environmental Impact Statement, DOE/EIS-0546 (Feb. 2022), *available at* https://www.energy.gov/sites/default/files/2022-02/final-eis-0546-mobile-microreactor-2022-02-volume-1.pdf.

76 *Id.* at 5-6.

77 Final Environmental Assessment for the Molten Chloride Reactor Experiment (MCRE) Project, DOE/EA-2209 (Aug. 2023), *available at* https://www.energy.gov/sites/default/files/2023-08/final-ea-2209-molten-chloride-reactor-2023-08.pdf.

78 *Id.* at 49.

79 Final Environmental Assessment for the Resumption of Transient Testing of Nuclear Fuels and Materials, DOE/EA-1954 (Feb. 2014), *available at* https://www.energy.gov/sites/default/files/2014/02/f8/EA-1954-FEA-2014.pdf.

80 *Id.* at 2, 6.

81 *Id.* at 41.

would further ensure that the environmental impacts are kept contained. Removing the NEPA requirements for these projects on DOE sites would significantly improve the ability of DOE to provide access to capabilities in a timely manner to support new nuclear development. Furthermore, even absent NEPA, the projects still would need to comply with other environmental requirements.

3.3.3. Broaden NEPA Categorical Exclusions to Cover Reactor Construction and Operation

- *Recommendation: DOE and NRC consider and implement new categorical exclusions under NEPA for construction and operation of new nuclear reactors, removing the potential impact of NEPA reviews to new reactor regulatory approvals.*
- *Status: New recommendation.*
- *Implementation: Requires legislative change or rulemaking by DOE or NRC.*

If NEPA is not eliminated for all reactors as discussed above, there are other ways to minimize the impacts of NEPA reviews on new nuclear reactor projects. NEPA allows a Federal agency to determine that a category of actions is "categorically excluded," and therefore subject to a lower level of review, when the actions normally do not significantly affect the quality of the human environment. DOE's NEPA implementing procedures, 10 C.F.R. Part 1021, do not identify a categorical exclusion for the construction and operation of any types of reactors, but instead identify these activities as normally requiring an EIS. Similarly, NRC's NEPA implementing procedures, 10 C.F.R. Part 51, normally require an EIS for reactor construction and operation.

NEPA defines "categorical exclusion" as "a category of actions that a Federal agency has determined normally does not significantly affect the quality of the human environment."[82] NEPA also states that "[a]n agency is not required to prepare an environmental document with respect to a proposed agency action if— . . . (2) the proposed agency action is excluded pursuant to one of the agency's categorical exclusions . . . ."[83] Therefore, NEPA does not require further environmental review for an action falling within an agency's categorical exclusions.

Although NEPA does not directly state what it means to "significantly affect" the environment, there is some discussion in the Council on Environmental Quality's (CEQ) former NEPA regulations at 40 C.F.R. § 1501.3(d) which focus on the context and intensity of any impacts and review general topics typically evaluated in NEPA documents (e.g., location, scope, cultural, endangered species).[84] Additionally, an April 2024 DOE final rule implementing new categorical exclusions explained that it considers past experience, a record showing normally no significant impacts, environmental reviews by other agencies, whether limited to disturbed land, etc.[85] Moreover, even after an agency establishes a categorical exclusion, it still must ensure that each action falls within the categorical exclusion and no "extraordinary circumstances" apply.[86] DOE's NEPA regulations also identify conditions that are "integral elements" for the categorical exclusions, meaning that to take advantage of a categorical exclusion an action must not violate the conditions.[87] Therefore, even with a categorical exclusion, project specific conditions could result in preparation of an Environmental Assessment or even an EIS.

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82 42 U.S.C. § 4336e(1).

83 42 U.S.C. § 4336(a).

84 Although the CEQ recently issued an interim final rule removing the CEQ regulations, Removal of National Environmental Policy Act Implementing Regulations, 90 Fed. Reg. 10,610 (Feb. 25, 2025), the regulations provide some insight into how these topics have been viewed in the past.

85 *See* National Environmental Policy Act Implementing Procedures, 89 Fed. Reg. 34,074, 34,075-076 (Apr. 30, 2024).

86 *See, e.g.*, 10 C.F.R. § 1021.410(b)(2).

87 *See* 10 C.F.R. Part 1021, App. B.

Looking at recent NEPA reviews for smaller reactors, including at INL, there is support that these projects normally would not have significant impacts. This includes the following examples: DOE/EA-2146 for the 100-kilowatt thermal (kWth) MARVEL project[88]; DOE/EA-2209 for the 200 kWth MCRE[89]; EIS for 1-5-megawatt thermal (mWth) Prototype Mobile Microreactor (Project Pele)[90]; NUREG-2263 for the 35 mWth Kairos Hermes Test Reactor.[91] These NEPA reviews only identify small impacts or determined impacts would not be significant.

In a recent January 2025 paper, the Columbia University Center on Global Energy Policy reviewed past NEPA reviews for new reactors.[92] It concluded that "in no case from the license proceedings in the 2000s and 2010s did the NRC find that a new reactor project would create large (i.e., destabilizing) adverse impacts—for either a brownfield or a greenfield host site."[93] This provides further support for NEPA categorical exclusions for construction and operation of new reactors. The Nuclear Innovation Alliance (NIA) recently released a report specifically addressing categorical exclusions for microreactors.[94] The report concluded:

> Establishing a categorical exclusion for microreactors would accelerate the deployment of advanced nuclear energy while ensuring an appropriate level of regulatory oversight. Initial Environmental Impact Statements (EISs) and Environmental Assessments (EAs) conducted by multiple agencies have determined that microreactors have minimal to no environmental impact, underscoring the need for a more efficient review process to satisfy NEPA. Rather than requiring a costly and time-consuming EIS or EA for each microreactor, the NRC should proactively establish a categorical exclusion. This approach would conserve agency and applicant resources, reduce unnecessary delays, and enable microreactors to provide clean, reliable, and abundant energy to support energy security and climate goals.[95]

In summary, NEPA allows a Federal agency to implement a categorical exclusion for actions which normally do not significantly affect the quality of the human environment. Given the above recent experience showing a lack of any significant impacts for small reactor projects, DOE and NRC should pursue a categorical exclusion for such projects. A categorical exclusion for small reactors should be straightforward. However, categorical exclusions could be considered for other types of projects, such as those with high power levels. Implementing a categorical exclusion for small reactors would have significant benefits related to the timing and cost of those projects. The NEPA reviews can take many months or years to complete and may cost millions in preparation and review fees. These projects are expected to increase dramatically in upcoming years and right-sizing these NEPA reviews could

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88 DOE/EA-2146, Final Environmental Assessment for the Microreactor Applications Research, Validation, and Evaluation (MARVEL) Project at Idaho National Laboratory (June 2021), *available at* https://www.energy.gov/sites/default/files/2021-06/final-ea-2146-marvel-idaho-2021-06.pdf.

89 DOE/EA-2209, Final Environmental Assessment for the Molten Chloride Reactor Experiment (MCRE) Project (Aug. 2023), *available at* https://www.energy.gov/sites/default/files/2023-08/final-ea-2209-molten-chloride-reactor-2023-08.pdf.

90 Project Pele Mobile Nuclear Reactor, https://www.cto.mil/pele_eis/.

91 NUREG-2263, Environmental Impact Statement for the Construction Permit for the Kairos Hermes Test Reactor (Aug. 2023), *available at* https://www.nrc.gov/docs/ML2321/ML23214A269.pdf.

92 *See* Improving the Efficiency of NRC Power Reactor Licensing: Environmental Reviews (Jan. 2025), *available at* https://www.energypolicy.columbia.edu/wp-content/uploads/2025/01/NEPA-CGEP_Report_012225-2.pdf.

93 *Id.* at 40.

94 Improving Environmental Reviews Through a Categorical Exclusion for Microreactors (Apr. 2025), *available at* https://nuclearinnovationalliance.org/improving-environmental-reviews-through-categorical-exclusion-microreactors?utm_medium=email&_hsenc=p2ANqtz-_5fL0kFlR5TABbvMVufTNY9j2x-XcKiyCIANSihCVAM-_RhAhNG9pU6YrfXko01eH9ZJ64D97xCeD_UsME4TIdZWBSEQ&_hsmi=354667473&utm_content=354667473&utm_source=hs_email.

95 *Id.* at 8.

substantially support their success and the adoption of expanded nuclear for U.S. prosperity and energy security.

3.4. Reforms to Improve Safety Reviews

3.4.1. Broaden Types of Reactors Licensed Under the Lower AEA Section 104 Standard

- *Recommendation: License advanced nuclear reactors according to the Section 104 standard for "minimal amount" of regulation necessary for the NRC to satisfy its obligations under the AEA to promote the common defense and security and to protect the health and safety of the public.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change.*

AEA Section 102 addresses the different categories of NRC licenses for reactors for industrial or commercial purposes.[96] Section 102a explains that, except for a couple of exceptions which would not apply to new reactors today (i.e., those licensed prior to this law, Cooperative Power Reactor Demonstration Program), any such reactor for industrial or commercial purposes shall be licensed under Section 103.[97]

Section 103 (Commercial Licenses) authorizes the NRC to issue licenses to persons applying to "manufacture, produce, transfer, acquire, possess, use, import, or export" reactors for industrial or commercial purposes.[98] Section 103a further explains: "Such licenses shall be issued in accordance with the provisions of chapter 16 and subject to such conditions as the Commission may by rule or regulation establish to effectuate the purposes and provisions of this Act."[99] Therefore, the NRC has significant discretion in determining the standards for licensing these commercial reactors.

Section 104 (Medical Therapy and Research and Development) authorizes the NRC to issue licenses for a variety of purposes.[100] Section 104a addresses reactors for medical therapy.[101] Section 104b addresses the exceptions in Section 102 mentioned above, but also states that the Commission could issue licenses for reactors for industrial and commercial purposes "where specifically authorized by law."[102] This statement would allow the NRC to license a commercial reactor under Section 104b if a law specifically allowed it to do so. Finally, Section 104c addresses reactors used for research and development, such as university research reactors.[103] Importantly, for each of these categories of reactors in Section 104, the NRC is directed to impose only the "minimum amount" of regulation to allow the NRC to satisfy its "obligations" under the AEA "to promote the common defense and security and to protect the health and safety of the public," while also allowing the widest use of the reactors. This leads to less stringent regulation of reactors licensed under Section 104 than those licensed under Section 103.

This difference in regulation standards for Sections 103 and 104 might have been appropriate for licensing very large commercial reactors as compared to very small university research reactors when nuclear power was new. This is not the case, however, when looking at the advanced nuclear reactors being pursued today with the very safe track record of the nuclear industry over decades of commercial reactor operation. Given the much smaller potential hazards (e.g., TRISO fuel) or source terms associated with advanced reactor concepts and/or advanced safety features, these advanced nuclear reactors should be licensed according to the Section 104 standard for "minimal amount" of regulation necessary for the

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96 42 U.S.C. § 2132.

97 42 U.S.C. § 2132(a).

98 42 U.S.C. § 2133.

99 42 U.S.C. § 2133(a).

100 42 U.S.C. § 2134.

101 42 U.S.C. § 2134(a).

102 42 U.S.C. § 2134(b).

103 42 U.S.C. § 2134(c).

NRC to satisfy its obligations under the AEA to promote the common defense and security and to protect the health and safety of the public.

This change is most directly accomplished with legislation stating that these advanced nuclear reactors are authorized by law to be licensed under Section 104b. That Section already contemplates that industrial and commercial reactors may be specifically authorized by law to be licensed under the Section and using the minimum amount of regulation standard. To be consistent with recent legislation, the category of reactors subject to Section 104b should be any "advanced nuclear reactor," except excluding "fusion machines" because their licensing is being addressed elsewhere:[104]

> (1) Advanced nuclear reactor.-The term 'advanced nuclear reactor' means a nuclear fission reactor or fusion machine, including a prototype plant (as defined in sections 50.2 and 52.1 of title 10, Code of Federal Regulations (as in effect on the date of enactment of this Act [Jan. 14, 2019])), with significant improvements compared to commercial nuclear reactors under construction as of the date of enactment of this Act, including improvements such as-
>
> (A) additional inherent safety features;
>
> (B) significantly lower levelized cost of electricity;
>
> (C) lower waste yields;
>
> (D) greater fuel utilization;
>
> (E) enhanced reliability;
>
> (F) increased proliferation resistance;
>
> (G) increased thermal efficiency; or
>
> (H) ability to integrate into electric and nonelectric applications.

One benefit of the Section 104 minimum amount of regulation standard is it is essentially a graded approach. The minimum amount of regulation may be higher for reactors with a greater risk than those with minimal risk. Nonetheless, the expectation should be that the standard is much lower than what is being applied today under Section 103. Additionally, the NRC already has significant experience with applying this lower standard through its licensing of many university research reactors.

In summary, this change, combined with the revision to the NRC mission to pursue efficiency as required by the ADVANCE Act, would provide significant emphasis on and support for timely licensing of new commercial reactors. It is important, however, to ensure that the NRC appropriately applies these standards as it licenses these reactors and does not simply apply the 103 standard even if licensing under 104b.

3.4.2. Reduce ACRS Burden

- *Recommendation: Reduce the excessive burden of ACRS reviews by limiting its reviews to unique or new safety issues having significant hazard potential.*
- *Status: Revised from Recommendation 2.2.2 in April 2023 Report.*
- *Implementation: Requires legislative change.*

The ACRS serves as an advisory committee to the Commission for a variety of topics identified in the AEA. AEA Section 29 states in part the following about the ACRS:

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[104] 42 U.S.C. § 2215 note.

> There is established an Advisory Committee on Reactor Safeguards consisting of a maximum of fifteen members appointed by the Commission for terms of four years each. The Committee shall review safety studies and facility license applications referred to it and shall make reports thereon, shall advise the Commission with regard to the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards, and shall perform such other duties as the Commission may request.[105]

AEA Section 182b. further states:

> The Advisory Committee on Reactor Safeguards shall review each application under section 103 or section 104b. for a construction permit or an operating license for a facility, any application under section 104c. for a construction permit or an operating license for a testing facility, any application under section 104a. or c. specifically referred to it by the Commission, and any application for an amendment to a construction permit or an amendment to an operating license under section 103 or 104a., b., or c. specifically referred to it by the Commission, and shall submit a report thereon which shall be made part of the record of the application and available to the public except to the extent that security classification prevents disclosure.[106]

Based on the above requirements, the ACRS performs a detailed review of safety issues in every new reactor application. The review includes meetings with the NRC Staff and applicants and development of reports on those reviews. The ACRS webpage on the NRC's website illustrates the tremendous number of meetings and reports undertaken by the ACRS.[107] In some busy licensing years, this can result in approximately 80 meetings and 70 reports by the ACRS.[108] This workload could increase significantly if there is a wave of advanced reactor applications.

These reviews by the ACRS have become burdensome and time-consuming for industry and regulators alike and have resulted in essentially a new review of safety issues, redundant with the NRC Staff's review. As one example, NuScale has explained that during its design certification review for the NuScale Small Modular Reactor, the ACRS conducted some 40 meetings, totaling approximately 440 hours of in-person meeting time.[109] As part of its lessons learned from the NRC review, NuScale recommended:

> Clarify the role of the Advisory Committee on Reactor Safeguards (ACRS). The ACRS's approach during the NuScale [design certification application (DCA)] review worked because the NuScale SMR was the only advanced reactor design under review. However, it was unnecessarily broad and burdensome and the same approach may not work if there are multiple advanced reactor designs under review, as expected in the near future. The consequence of not clarifying the role of the ACRS is that the ACRS, due to resource constraints, may delay

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105 42 U.S.C. § 2039.

106 42 U.S.C. § 2232(b).

107 *See* Advisory Committee on Reactor Safeguards Document Collections, https://www.nrc.gov/reading-rm/doc-collections/acrs/index.html.

108 *See, e.g.*, 2011 Advisory Committee on Reactor Safeguards (ACRS) Meeting Schedule and Related Documents, https://www.nrc.gov/reading-rm/doc-collections/acrs/agenda/2011/index.html; Advisory Committee on Reactor Safeguards (ACRS) 2011 Letter Reports, https://www.nrc.gov/reading-rm/doc-collections/acrs/letters/2011/index.html.

109 Letter from T. Bergman, NuScale, to M. Doane, NRC EDO, Lessons-Learned from the Design Certification Review of the NuScale Power, LLC Small Modular Reactor, Enclosure, at 2 (Feb. 19, 2021), *available at* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21050A431.

the approval and deployment of nuclear power plants with advanced safety features.[110]

It is challenging to determine the specific cost and delay due to excessive ACRS meetings because those meetings are intermingled with the Staff review. Nonetheless, the cost and delay must be significant given the need to submit information to the ACRS, prepare for formal meetings with the ACRS, participate in those meetings, and address feedback from the ACRS. This process requires significant effort by both the NRC Staff and the applicant, diverting those resources away from the Staff's application review and the applicant's support of that review.

With the above experience in mind, and with the expectation of numerous advanced reactor applications, it is appropriate to revisit the scope of the ACRS review. The ACRS was formed at a time in which the AEC had full responsibility for initial new reactor projects. That is no longer the case as the NRC is established as an independent regulator and has many decades of experience. Additionally, although AEA Section 182b. directs the ACRS to review certain applications, the AEA does not describe the level of detail of that review. However, it certainly cannot mean that the 15-member ACRS must perform a detailed review for each new reactor application resulting in dozens of meetings, hundreds of hours in meetings, and countless hours reviewing each application outside of meetings.

This detailed review is unnecessary for all new reactor proceedings. The statutory language in AEA Sections 29 and 182b. should be revised to establish a new charter for the ACRS directing the appropriate scope and level of review for new reactor applications. This scope would instruct the ACRS to coordinate with the Commission and Commission Staff and only review safety topics which are new or unique and present a potential significant hazard. A revised scope should also include deletion of AEA Section 182b. and rely upon and clarify the language in AEA Section 29 so that ACRS reviews address "safety studies and facility license applications referred to it." This approach should be clarified to instruct the ACRS to only conduct a review of new or unique issues with some potential hazard, not every license application. This balance should allow the NRC to continue to benefit from the independent review capabilities of the ACRS for the most risk significant topics, while minimizing the overall impact on licensing actions. Although some efficiencies in ACRS reviews may be obtained without statutory changes, the above statutory changes are the most direct means to achieve immediate and lasting improvements.[111]

3.4.3. Allow Non-Public NRC Meetings with Applicants

- *Recommendation: Allow non-public meetings between the NRC Staff and applicants to facilitate the efficiency of licensing reviews, while retaining the extensive information and processes otherwise available to the public.*
- *Status: Same as Recommendation 2.2.3 in April 2023 Report.*
- *Implementation: Requires legislative change.*

The NRC has issued a policy statement on public meetings and has interpreted it in a way that almost all substantive verbal interactions between an applicant and the NRC Staff must occur in a public meeting.[112] The NRC states the purpose of the policy statement is "to conduct business in an open manner, and to balance openness and transparency with the need to exercise regulatory and safety

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110 *Id.* at 2.

111 The NIA issued a report in 2023 with its own recommendations on improving ACRS effectiveness and efficiency. Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards (Mar. 2023), *available at* https://nuclearinnovationalliance.org/improving-effectiveness-and-efficiency-advisory-committee-reactor-safeguards. The report similarly recommended re-focusing the scope and depth of ACRS reviews, *Id.* at 11-19, but also made recommendations on improving ACRS operations and management, reducing the cost of ACRS reviews, and adjusting management of the ACRS. *Id.* at 20-27. *See also* BPC 2024 Report, at 12 (recommending that the ACRS review only novel or safety-significant issues rather than all applications).

112 *See* Enhancing Participation in NRC Public Meetings, 86 Fed. Reg. 14,964 (Mar. 19, 2021).

responsibilities without undue administrative burden."[113] Notwithstanding this reference to a balance, including undue administrative burden, the NRC provides only limited exceptions to making interactions between the NRC Staff and applicants on substantive application topics subject to a public meeting. The available exceptions in the policy statement are as follows:[114]

a. Is specifically authorized by an Executive Order to be withheld in the interests of national defense or foreign policy (classified information);

b. Is specifically exempt from public disclosure by statute (e.g., safeguards or proprietary information);

c. Is of a personal nature where such disclosure would constitute a clearly unwarranted invasion of personal privacy;

d. Is related to a planned, ongoing, or completed investigation, or contains information compiled for law enforcement purposes;

e. Could compromise the ongoing reviews and inspections associated with an open allegation;

f. Could result in the inappropriate disclosure and dissemination of preliminary, pre-decisional, or unverified information;

g. Is for general information exchange having no direct, substantive connection to a specific NRC regulatory decision or action; however, should discussions in a closed meeting approach issues that might lead to a specific regulatory decision or action, the NRC staff may advise the meeting attendees that such matters cannot be discussed and propose discussing the issues in a future public meeting; or

h. Indicates that the administrative burden associated with public attendance at the meeting could interfere with the NRC staff's execution of its safety and regulatory responsibilities, such as when the meeting is an integral part of the execution of the NRC inspection program.

Except for some limited circumstances involving security or proprietary information, none of these exceptions typically would apply to the substantive interactions between an applicant and the NRC Staff related to an application. This restriction prevents the free flow of information and requires the scheduling of public meetings to address topics which could be resolved or clarified in a brief conversation between the applicant and the NRC Staff. Indeed, the policy statement specifies that the NRC provides a minimum of 10 days' notice for these public meetings.[115] Such a delay is unreasonable when the administrative burden of setting up a call, posting a meeting notice, hosting a meeting, preparing meeting notes, etc. may delay the continuous progress of the NRC Staff review of an application when a brief telephone call may prevent delay, avoid extensive public meetings, and reduce the number of Requests for Additional Information from the Staff. The current practices also are not consistent with the current technology-driven and faster pace of communications in today's society.

Although the transparency of the NRC is to be commended, the use of these extensive and delayed public meetings is not the only means for transparency on these application topics. Except for limited exceptions (e.g., Safeguards Information), members of the public have full disclosure of application documents, including all revisions to the application during the licensing review. They also have access to NRC Requests for Information, responses to those requests, other public meetings, etc. If needed, the

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[113] *Id.* at 14,965.

[114] *Id.* at 14,967.

[115] *Id.* at 14,965.

NRC also could prepare summaries of communications held between only the NRC Staff and the applicant and make those summaries publicly available through the NRC website. Congressional direction to the NRC about more flexibility to engage with applicants outside of formal public meetings would greatly streamline this portion of the NRC Staff review. This also would be consistent with the recent direction in the ADVANCE Act to incorporate efficiency into the NRC's mission statement.

3.4.4. Reduce Burden of Gathering Meteorological Data

- *Recommendation: Provide flexibility to new reactor applicants to use existing meteorological data rather than the time consuming and burdensome practice of building a new meteorological tower and collecting 1-3 years of data prior to application submission.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change or NRC action.*

To support new reactor licensing and operation, the NRC logically requires an applicant to submit meteorological data related to a particular site. For example, NRC regulations at 10 C.F.R. § 100.20(c)(2) state: "Meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design (such as maximum probable wind speed and precipitation) must be identified and characterized." This meteorological information may also impact emergency planning or be needed to satisfy NEPA reviews.

The NRC has issued Regulatory Guide 1.23 to provide guidance to applicants to satisfy these regulatory requirements.[116] With respect to meteorological information submitted with an application, this guidance states:

> The minimum amount of onsite meteorological data to be provided at the time of application (1) for a construction permit is a representative consecutive 12-month period; (2) for an operating license is a representative consecutive 24-month period, including the most recent 1-year period; and (3) for an early site permit or a combined license that does not reference an early site permit is a consecutive 24-month period of data that is defendable, representative and complete, but not older than 10 years from the date of the application. However, 3 or more years of data are preferable and, if available, should be submitted with the application.[117]

Therefore, the NRC requires new reactor applicants to provide a minimum of 12-months to 24-months (or preferably 3 or more years) of onsite meteorological data, depending on the type of application. This has typically required new reactor applicants to construct new meteorological towers with very specific parameters and to record data for multiple years to support submittal of an application to the NRC. This has been a substantial burden to applicants and this delay will not support the timeframes expected for submittal of future new reactor applications.

The NRC should revisit this guidance to look at additional flexibilities, such as use of existing meteorological data from towers at adjacent nuclear plants, National Oceanic and Atmospheric Administration (NOAA) towers, nearby airport towers, nearby DOE towers, etc., as well as the use of improved models that have demonstrated enhanced predictive capabilities. The NRC should also consider how much of these data are needed at application submission and whether they can be provided prior to operation. These considerations also would support efforts related to ADVANCE Act Section 206, which directed the NRC to evaluate expedited licensing for covered sites (e.g., brownfield sites) based on the "availability of historical site-specific environmental data."

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116 NRC Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants (Rev. 1, Mar. 2007), *available at* https://www.nrc.gov/docs/ML0703/ML070350028.pdf.

117 *Id.* at 5.

3.4.5. Expedite NRC Reviews of Nth-of-a-Kind Microreactors with Previously Approved Designs

- *Recommendation: For applications to the NRC for construction and/or operation of a microreactor (≤50 MWe) previously approved by the NRC, require the NRC to complete its review and issue a licensing decision within three months.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change.*

As discussed above, a tremendous need for new nuclear power exists in the United States. This is necessary for energy security and energy dominance, as well as ensuring that the United States leads in AI development by using nuclear reactors to power data centers. Although not the only hurdle, licensing of new nuclear reactors is an impediment to achieving these goals. The United States needs to revolutionize how we think about nuclear licensing. A good start is providing substantial benefit to nth-of-a-kind microreactors (≤50MWe),[118] meaning any microreactors where the design already has been approved by the NRC.

It is understandable that NRC's licensing of a first-of-a-kind reactor will take more time than later reviews. The first review may need to evaluate new design features, look at new design calculations, consider satisfaction of NRC design requirements and applicable codes and standards, analyze how the design interacts with a particular site, complete ACRS reviews, etc. Review of a subsequent application, in which the applicant confirms and the NRC verifies that the design approved as part of the earlier application is utilized, should be much faster. If standardization is followed, then the NRC's review of an nth-of-a-kind application should be limited to a small subset of safety issues related to the specific site.

Limiting this recommendation to microreactors at this time also should facilitate its adoption. Microreactors should have a much smaller footprint, smaller source term, and fewer site-specific safety considerations. This should result in a project which has limited safety concerns, given that the design already would have been reviewed and approved by the NRC under this scenario. The project also should have limited impact on the environment and other natural resources.

For these reasons, any applications to the NRC for construction and/or operation of a microreactor using a design already approved by the NRC should be approved within three months. Although this timeframe is aggressive, it should be achievable with implementation of other recommendations in this report. For example, removing the mandatory hearing requirement and excluding the project from NEPA, entirely or through categorical exclusion, should have significant time savings. Combining those savings without needing to re-review the design would greatly streamline the review process. This recommendation should be applied to all NRC new reactor licensing activities for microreactors, such as CPs, OLs, COLs, manufacturing licenses, etc.

3.4.6. Use General Licenses for Small Nuclear Reactors

- *Recommendation: Significantly improve the time and cost of licensing small nuclear reactors by implementing a general license approach for those reactors meeting pre-determined criteria and avoiding the need to submit a specific license application.*
- *Status: New Recommendation.*
- *Implementation: Requires legislative change.*

Depending on the activity, the AEA allows the NRC to issue either specific licenses or general licenses. The NRC issues specific licenses to a specific person or entity authorizing specifically stated

[118] *See, e.g.*, INL/MIS-22-70278-Revision-0, Taxonomic Guidance on Advanced Reactors (Dec. 2022) (defining microreactors as those less than or equal to 50 MWe), *available at* https://inldigitallibrary.inl.gov/sites/sti/sti/Sort_64448.pdf.

activities, and typically requires an application to be submitted by that person or entity. The NRC issues general licenses through a rulemaking process and they typically cover a broader range of activities for a class of individuals and apply without the need to submit an application.

Licenses issued for reactors under the AEA are currently specific licenses. AEA Section 101 states that it shall be unlawful (except for a military exception in AEA Section 91) for any person to "transfer or receive in interstate commerce, manufacture, produce, transfer, acquire, possess, use, import, or export" a reactor except under a license issued by the NRC pursuant to AEA Sections 103 or 104.[119] Sections 103 and 104 each address persons applying for licenses and then for the NRC to issue licenses to those persons, demonstrating that these are specific licenses.[120] This specific license process results in an applicant needing to prepare an extensive application and the NRC needing to review it and prepare detailed environmental and safety documentation.

The AEA allows for general licenses in many other areas. These include:

- Distribution of specific nuclear material "depending upon the degree of importance to the common defense and security or to the health and safety of the public"[121]
- Distribution of source material "depending upon the degree of importance to the common defense and security or to the health and safety of the public"[122]
- Use of byproduct material "for research or development purposes, for medical therapy, industrial uses, agricultural uses, or such other useful applications as may be developed"[123]
- Certain component parts of production or utilization facilities requiring licenses under AEA Section 101, including for export purposes, "if the Commission determines in writing that such general licensing will not constitute an unreasonable risk to the common defense and security"[124]

These general licenses are codified by the NRC in its regulations.[125] Because they have been generically determined, persons or entities wanting to rely on the general licenses can typically do so without further NRC review, although in some cases they need to inform the NRC of their use and there would be consideration of whether the activities fall within the general license parameters.

The AEA should allow the use of general licenses for new nuclear reactors. This would be particularly appropriate for smaller nth-of-a-kind nuclear reactors which would have a much smaller risk profile. The NRC could issue a general license for each particular reactor meeting criteria to be generally licensable. This could occur after the NRC has approved the first-of-a-kind reactor of a particular reactor through a different licensing process, such as a separate CP/OL, COL, or design certification. This approach would be an expedited way to address the recommendation in Section 3.4.5 above. Through the rulemaking needed to implement the general license, the NRC could establish the parameters to utilize the general license. These parameters could include information such as the size of the site using the generally licensed reactor, the person or entity using the general license, qualifications of the person or entity, locations meeting necessary conditions for safe operation, etc.

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119 42 U.S.C. § 2131.

120 42 U.S.C. §§ 2133, 2134.

121 42 U.S.C. § 2073(b).

122 42 U.S.C. § 2093(b).

123 42 U.S.C. § 2111(a).

124 42 U.S.C. § 2139.

125 *See, e.g.*, 10 C.F.R. §§ 31.5-31.12 (general license for byproduct material); 40.20-40.28 (general license for source material); 70.18-70.20b (general license for special nuclear material); 72.210-72.220 (general license for storage of spent fuel at power reactor sites); 110.19-110.27 (general license for imports and exports of nuclear materials and equipment).

Use of general licenses would address past concerns about the length of licensing reviews and would become almost immediate approval of a project using the covered reactor. Such a change could remove the licensing hurdle while still maintaining safety. However, it would avoid re-review of design issues and unnecessary environmental reviews, which would take place as part of the rulemaking for the general license.

This recommendation is similar to one proposed by the Nuclear Energy Institute (NEI) last year in a report on "Regulation of Rapid High-Volume Deployable Reactors in Remote Applications (RHDRA) and Other Advanced Reactors."[126] This extensive report addresses issues which must be addressed in order to achieve a 6-month deployment timeline for certain new reactors.[127] Attachment B of the paper further discusses the use of general licenses for new reactors, and concludes the following:

> As discussed in the Regulatory Proposal paper, it is possible for the NRC to substantially shorten the licensing timeframes for reactors within the current AEA authorities that would achieve the 6-month deployment timeline from site identification to reactor operation that is needed to enable the RHDRA business model. However, a general licensing approach would be more efficient and effective in regulating nuclear reactors, such as RHDRA, and could enable even shorter deployment timeframes that would be needed to support other business models. If and when Congress amends the AEA to authorize and direct the NRC to develop a general licensing approach for certain nuclear reactors, then the NRC would be able to pursue a rulemaking to develop such a general license framework for nuclear reactors.[128]

For the above reasons, allowing general licenses for new nuclear reactors could be game-changing and drastically improve the likelihood of broad use of the covered reactors. This also could modify the development process for a small reactor project to more closely match those of other energy sources, such as wind, solar, or natural gas.

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126 NEI Proposal Paper, Regulation of Rapid High-Volume Deployable Reactors in Remote Applications (RHDRA) and Other Advanced Reactors (July 2024), *available at* https://www.nrc.gov/docs/ML2421/ML24213A337.pdf.

127 *See id.* at i.

128 *Id.*, Att. B, at 8 (citations omitted).