U.S. House Committee on Energy and Commerce
Subcommittee on Energy, Climate, and Grid Security
"American Nuclear Energy Expansion: Updating Policies for Efficient, Predictable Licensing and Deployment"
[July 18, 2023]

1. Letter to U.S. Nuclear Regulatory Commission Chairman Christopher T. Hanson from Members of the U.S. Congress, July 14, 2023, submitted by the Majority.
2. Letter to Speaker Nancy Pelosi from Nuclear Regulatory Commission Commissioner Dale E. Klein, June 9, 2008, submitted by the Majority.
3. A report from the Nuclear Innovation Alliance entitled "Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards" March 2023, submitted by the Majority.
4. Remarks of Jeffrey S. Merrifield to the American Nuclear Society Annual Meeting, June 13, 2023, submitted by the Majority.
5. American Nuclear Society response to House Committee on Energy and Commerce nuclear RFI request, May 5, 2023, submitted by the Majority.
6. The Breakthrough Institute response to House Committee on Energy and Commerce nuclear RFI request, May 5, 2023, submitted by the Majority.
7. Clean Air Task Force response to House Committee on Energy and Commerce nuclear RFI request, May 5, 2023, submitted by the Majority.
8. ClearPath response to House Committee on Energy and Commerce nuclear RFI request, May 5, 2023, submitted by the Majority.
9. Idaho National Laboratory response to House Committee on Energy and Commerce nuclear RFI request, April 26, 2023, submitted by the Majority.
10. Idaho National Laboratory report entitled "Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process" April 2023, submitted by the Majority.
11. Nuclear Energy Institute response to House Committee on Energy and Commerce nuclear RFI request, May 4, 2023, submitted by the Majority.
12. Nuclear Innovation Alliance response to House Committee on Energy and Commerce nuclear RFI request, May 5, 2023, submitted by the Majority.
13. Letter to Chair Rodgers, Ranking Member Pallone, Chairman Duncan, and Ranking Member DeGette from Nuclear Innovation Alliance, July 17, 2023, submitted by the Majority.

14. Third Way response to House Committee on Energy and Commerce nuclear RFI request, May 8, 2023, submitted by the Majority.
15. United States Nuclear Industry Council response to House Committee on Energy and Commerce nuclear RFI request, May 4, 2023, submitted by the Majority.
16. Letter to Chair Rodgers, Ranking Member Pallone, Chairman Duncan, and Ranking Member DeGette from the Uranium Producers of America, July 18, 2023, submitted by Rep. Latta.

Congress of the United States
Washington, DC 20510

July 14, 2023

The Honorable Christopher T. Hanson
Chairman
US Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Hanson,

We write to urge you to carefully review and modify, as necessary, the proposed rule titled "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors" to enable the successful use of the rule for licensing of advanced nuclear reactors.

In 2018, Congress passed the Nuclear Energy Innovation and Modernization Act (NEIMA) with broad bipartisan support.[1] This law reformed the Nuclear Regulatory Commission's (NRC) fee structure and required regulatory reforms to help enable efficient licensing of advanced nuclear reactor technologies.

NEIMA included specific direction for the Commission to "complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use by commercial advanced nuclear reactor applicants for new reactor license applications" by December 31, 2027.[2]

To implement this direction, the Commission, with congressional support, directed the NRC staff to develop the rulemaking on an accelerated schedule.[3] This schedule has provided the Commission with sufficient time to address issues identified during the rulemaking drafting process, while still complying with the statutory deadline.

Following the Commission's direction, the NRC staff took an iterative approach that resulted in extensive public interaction as the proposed rule was developed.[4] By September 2022, some 130 public comments were submitted in response to the proposal.[5]

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[1] P.L. 115-439.
[2] NEIMA defines the term "technology-inclusive regulatory framework" as a "regulatory framework developed using methods of evaluation that are flexible and practicable for application to a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods."
[3] https://www.nrc.gov/reactors/new-reactors/advanced/rulemaking-and-guidance/part-53.html
[4] https://www.nrc.gov/docs/ML2116/ML21162A095.pdf ("Since September 2020, the NRC staff has held 24 public meetings with external stakeholders and 16 public meetings with the [Advisory Committee on Reactor Safeguards] to discuss the Part 53 rulemaking.").
[5] https://www.regulations.gov/document/NRC-2019-0062-0012/comment

On March 1, 2023, the NRC staff provided the Commission with the proposed rule, known as the "Part 53" rule.[6] The proposed rule includes 1,173 pages and is supported by a draft environmental assessment, a draft regulatory analysis, and a staff analysis of alternative approaches to selected topics.[7]

We recognize the NRC staff's efforts to draft a proposal that balances flexibility for different technologies while providing sufficient predictability for applicants. Throughout the NRC's staff work on the rulemaking, a few key issues were consistently identified that are left for the Commission to resolve.[8] There is general agreement among stakeholders that some of the most important issues that a final Part 53 rule must address include:

- a two-framework structure that limits the proposed rule's overall benefit;
- the use of Quantitative Health Objectives (QHOs) as performance criteria;
- the inclusion of the principle of "As Low As Reasonably Achievable" (ALARA) as a design requirement;
- the requirement to protect against "beyond-design-basis-events" (BDBEs) in the design basis;
- the inclusion of a facility safety program; and
- inconsistent application of new programs and terminology.

Any newly established Part 53 regulations must enable the NRC to fulfill its mission 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."[9] We appreciate the NRC staff's hard work, but it is incumbent on the Commission to ensure that the final rule meets the intent of the law.

We all agree that a successful Part 53 regulatory framework should reflect congressional intent and be used to license the next generation of nuclear reactors. In order to be effective, we urge the Commission to work to address any outstanding issues prior to issuance of a final rule. Your review and modifications of the proposed rule will determine if that success is achieved. We appreciate that all five Commissioners recently agreed that the framework must be usable, and you committed to provide specific direction to resolve outstanding issues.[10]

While the initial advanced reactor applications are expected to use existing licensing frameworks, it is critical and urgent that the new framework is established with the capacity to

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[6] The proposed rule is referenced as the "Part 53" rule for its expected location in the Code of Federal Regulations.
[7] https://www.nrc.gov/docs/ML2116/ML21162A102.pdf
[8] See, for example, Patrick White on behalf of Nuclear Innovation Alliance "NIA Public Comment on Part 53, Rulemaking Process," August 31, 2022; Adam Stein on behalf of Breakthrough Institute, "Comment on Part 53[Regulation Identified Number RIN-3150-AK31; Docket ID NRC-2019-0062], August 31, 2022; Brett Rampal on behalf of Clean Air Task Force, "Comments on Clean Air Task Force in Response to the U.S. Nuclear Regulatory Commission's Proposed Rule on 'Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors,' 85 Fed Reg. 71,002 (Nov. 6, 2020), Docket ID No. NRC-2019-0062."
[9] https://www.nrc.gov/about-nrc.html
[10] US Senate Committee on Environment and Public Works, "The Nuclear Regulatory Commission's Proposed Fiscal Year 2024 Budget," April 19, 2023.

license the large volume of applications necessary to meet our energy and national security priorities, provide grid reliability, and achieve our environmental goals.

As you provide your specific revisions to the proposed rule, we urge you to consider previous and ongoing efforts by public stakeholders, and to utilize the public comment portion of the rulemaking process to seek specific information that may be incorporated into the final rule.

We thank you for your thoughtful consideration of our request.

Sincerely,

Thomas R. Carper
Chair
Committee on Environment & Public Works

Cathy McMorris Rodgers
Chair
Committee on Energy & Commerce

Shelley Moore Capito
Ranking Member
Committee on Environment & Public Works

Frank Pallone, Jr.
Ranking Member
Committee on Energy & Commerce

Tammy Duckworth
United States Senator

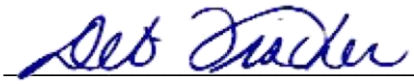
Michael C. Burgess, M.D.
Member of Congress

Chris Coons
United States Senator

Diana DeGette
Member of Congress

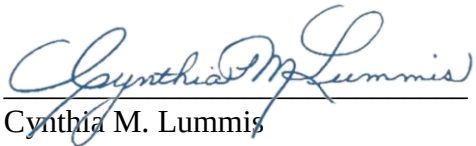
Pete Ricketts
United States Senator

Robert E. Latta
Member of Congress



Deb Fischer
United States Senator

Doris Matsui
Member of Congress



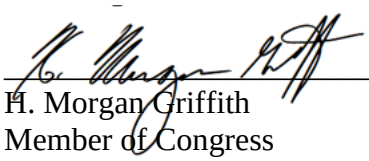
Cynthia M. Lummis
United States Senator

Brett Guthrie
Member of Congress

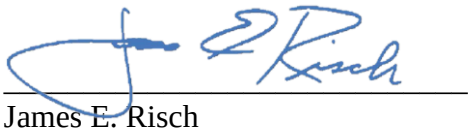
Martin Heinrich
United States Senator

Kathy Castor
Member of Congress

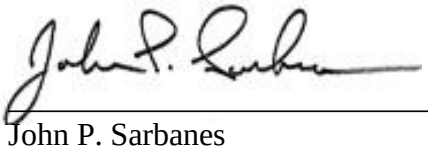
Ted Budd
United States Senator



H. Morgan Griffith
Member of Congress



James E. Risch
United States Senator



John P. Sarbanes
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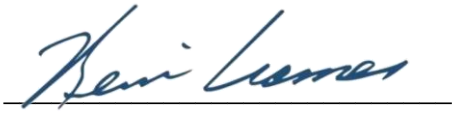
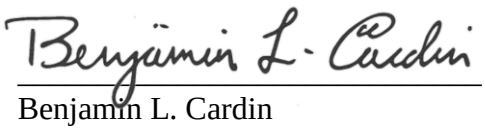


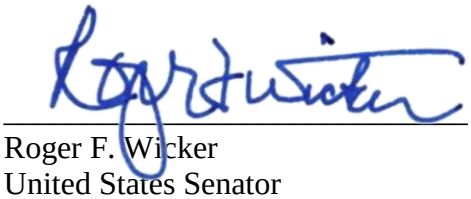
Kevin Cramer
United States Senator

Bill Johnson
Member of Congress



Benjamin L. Cardin
United States Senator

Paul D. Tonko
Member of Congress



Roger F. Wicker
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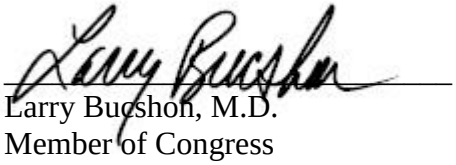
Gus M. Bilirakis
Member of Congress

Sheldon Whitehouse
United States Senator

Tony Cárdenas
Member of Congress

Lindsey O. Graham
United States Senator



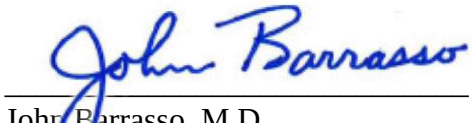
Larry Bucshon, M.D.
Member of Congress

Mark Kelly
United States Senator

Scott H. Peters
Member of Congress

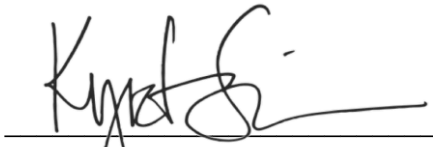
Mike Crapo
United States Senator

Richard Hudson
Member of Congress



John Barrasso, M.D.
United States Senator

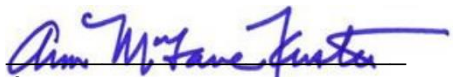
Marc A. Veasey
Member of Congress



Kyrsten Sinema
United States Senator

Tim Walberg
Member of Congress

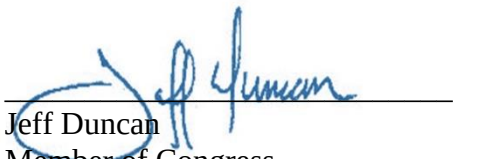
Joe Manchin III
United States Senator



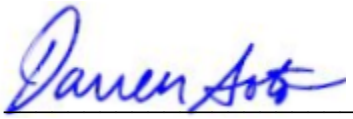
Ann McLane Kuster
Member of Congress

Earl L. "Buddy" Carter
Member of Congress

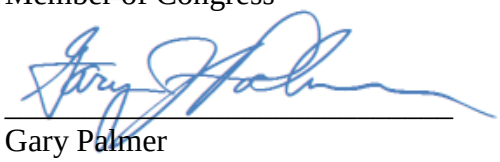
Lisa Blunt Rochester
Member of Congress



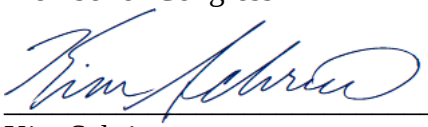
Jeff Duncan
Member of Congress



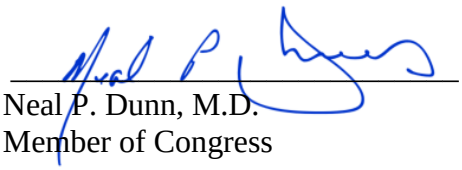
Darren Soto
Member of Congress



Gary Palmer
Member of Congress

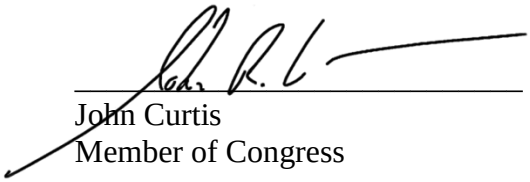


Kim Schrier
Member of Congress



Neal P. Dunn, M.D.
Member of Congress

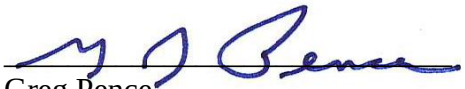
Lori Trahan
Member of Congress



John Curtis
Member of Congress

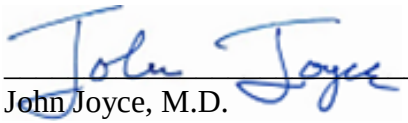
Lizzie Fletcher
Member of Congress

Debbie Lesko
Member of Congress



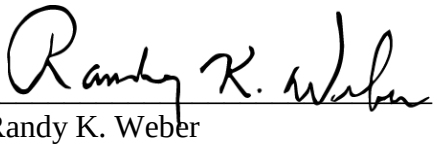
Greg Pence
Member of Congress

Dan Crenshaw
Member of Congress

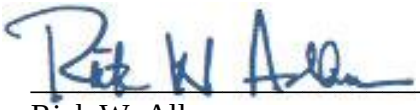


John Joyce, M.D.
Member of Congress

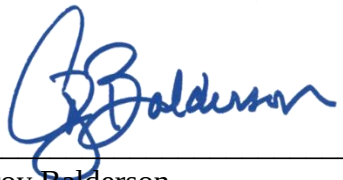
Kelly Armstrong
Member of Congress



Randy K. Weber
Member of Congress



Rick W. Allen
Member of Congress



Troy Balderson
Member of Congress

Russ Fulcher
Member of Congress

August Pfluger
Member of Congress

Diana Harshbarger
Member of Congress

Mariannette Miller-Meeks, M.D.
Member of Congress

Kat Cammack
Member of Congress

Jay Obernolte
Member of Congress

Identical letter sent to:

The Honorable Christopher T. Hanson
Chairman
US Nuclear Regulatory Commission

The Honorable David A. Wright
Commissioner
US Nuclear Regulatory Commission

The Honorable Annie Caputo
Commissioner
US Nuclear Regulatory Commission

The Honorable Bradley Crowell
Commissioner
US Nuclear Regulatory Commission

June 9, 2008

The Honorable Nancy Pelosi
Speaker of the House of Representatives
Washington, D.C. 20515

Dear Madam Speaker:

On behalf of the U.S. Nuclear Regulatory Commission (NRC), I am pleased to provide an NRC draft bill that would amend the Atomic Energy Act of 1954 (AEA) and the Energy Reorganization Act of 1974. These provisions are intended to enhance the efficiency of NRC operations, the security of NRC-regulated facilities, and compliance with NRC regulatory requirements.

More specifically, this legislation would accomplish the following objectives:

(1) Eliminate the requirement to hold uncontested hearings on applications to the NRC for granting a construction permit for a utilization or production facility, or for granting a combined construction and operating license under the AEA, or for issuance of a license under AEA sections 53 and 63 for the construction and operation of any uranium enrichment facility;

(2) Reduce the program briefings of the Commission on NRC's Equal Employment Opportunity program from two to one per year;

(3) Ensure that NRC certificate holders and their contractors and subcontractors will be subject to civil penalties for AEA violations and violations of certain provisions of the Nuclear Waste Policy Act of 1982; and

(4) Provide the Commission with authority to require fingerprinting of (a) individuals designated by licensees or certificate holders to review the trustworthiness and reliability of individuals who are already required to be fingerprinted under AEA section 149, (b) employees of licensees or certificate holders who have authority to grant unescorted access to a utilization facility, or to designated radioactive material or other property, and (c) principal operating officers (or their equivalent) of individuals and entities already required to conduct fingerprinting under AEA section 149.

A draft bill and a legislative memorandum explaining the need for the provisions of the bill are enclosed with this letter.

Sincerely,

/RA/

Dale E. Klein

Enclosures:
1. Draft Bill
2. Legislative Memorandum

Identical letter sent to:

The Honorable Nancy Pelosi
Speaker of the House of Representatives
Washington, D.C. 20515

The Honorable Richard B. Cheney
President of the Senate
Washington, D.C. 20510

The Honorable Thomas R. Carper
Chairman, Subcommittee on Clean Air
and Nuclear Safety
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510
cc: Senator George V. Voinovich

The Honorable Barbara Boxer
Chairman, Committee on Environment
and Public Works
United States Senate
Washington, D.C. 20510
cc: Senator James M. Inhofe

The Honorable Rick Boucher
Chairman, Subcommittee on Energy
and Air Quality
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515
cc: Representative Fred Upton

The Honorable John D. Dingell
Chairman, Committee on Energy
and Commerce
United States House of Representatives
Washington, D.C. 20515
cc: Representative Joe Barton

The Honorable Peter J. Visclosky
Chairman, Subcommittee on Energy
and Water Development
Committee on Appropriations
United States House of Representatives
Washington, D.C. 20515
cc: Representative David L. Hobson

The Honorable Byron Dorgan
Chairman, Subcommittee on Energy
and Water Development
Committee on Appropriations
United States Senate
Washington, D.C. 20510
cc: Senator Pete V. Domenici

DRAFT BILL

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that this Act may be cited as the “Act to Streamline the Nuclear Regulatory Commission’s Licensing Process and Administrative Efficiency”.

SEC. 2. HEARINGS UNDER ATOMIC ENERGY ACT OF 1954.

(a) Section 189 a.(1)(A) of the Atomic Energy Act of 1954 (42 U.S.C. 2239(a)(1)(A)) is amended by--

(1) in the second sentence--

(i) deleting that portion of the sentence that begins with “The Commission” and ends with “Federal Register, on” and inserting “On”;

(ii) inserting “or an operating license” after “construction permit” each time “construction permit” is used in the sentence; and

(iii) deleting the period at the end of the sentence; and

(2) in the third sentence–

(i) deleting that portion of the sentence that beings with “In cases” and ends with “such a hearing”;

(ii) deleting “therefor” and inserting “for a hearing”; and

(iii) deleting “issue an operating license” and inserting “issue a construction permit, an operating license,”.

(b) Section 189 of the Atomic Energy Act of 1954 (42 U.S.C. 2239) is further amended by--

(1) in the second sentence of subsection a.(2)(A) (42 U.S.C. 2239(a)(2)(A)), deleting “required hearing” and inserting “hearing held by the Commission under this section”; and

(2) in subsection b. (42 U.S.C. 2239(b)), revising paragraph (2) by deleting “to begin operating“ and inserting “to operate”.

(c) The first sentence of subsection b. of section 185 of the Atomic Energy Act of 1954 (42 U.S.C. 2235(b)) is amended by deleting “After holding a public hearing under section 189 a.(1)(A),” and inserting “After holding a hearing under section 189 a.(1)(A), or if the Commission has determined that no hearing is required to be held under section 189 a.(1)(A),”.

(d) Section 193(b) of the Atomic Energy Act of 1954 (42 U.S.C. 2243(b)) is amended by–

(1) in paragraph (1), deleting “on the record with regard to the licensing of the construction and operation of a uranium enrichment facility under sections 53 and 63” and inserting “, if a person whose interest may be affected by the construction and operation of a uranium enrichment facility under sections 53 and 63 has requested a hearing regarding the licensing of the construction and operation of the facility”; and

(2) in paragraph (2), deleting “Such hearing” and inserting, “If a hearing is held under paragraph (1), the hearing”.

(e) The amendments in this section shall apply to all applications and proceedings pending before the Commission on or after the date of enactment of this section.

SEC. 3 REPORT ON EQUAL EMPLOYMENT OPPORTUNITY PROGRAM.

Section 209(c) of the Energy Reorganization Act of 1974 (42 U.S.C. 5849(c)) is amended by deleting “semiannual public meetings” and inserting “an annual public meeting”.

SEC. 4. CIVIL MONETARY PENALTIES.

The first sentence of section 234 a. of the Atomic Energy Act of 1954 (42 U.S.C. 2282(a)) is amended by—

(1) inserting “(including a contractor or subcontractor of a licensee or certificate holder of the Commission or of an applicant for a Commission license or certificate)” after “Any person”; and

(2) striking “any licensing or certification provision of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, 109, or 1701” and inserting: “any Commission regulatory requirement issued pursuant to or contained in this Act or section 133, 137, 180, or 218(a) of the Nuclear Waste Policy Act of 1982 (42 U.S.C. 10101 *et seq*.)”.

SEC. 5. ENHANCED FINGERPRINTING REQUIREMENTS.

Section 149 a.(1) of the Atomic Energy Act of 1954 (42 U.S.C. 2169) is amended by adding the following new subparagraph after subparagraph (B):

“(C) In addition to the foregoing fingerprinting requirements of this paragraph, the Commission may require an individual or entity described in subparagraph (A)(ii) to fingerprint—

“(i) any individual who has been designated by the individual or entity described in subparagraph A(ii) (or by a contractor or subcontractor of such individual or entity) to determine the trustworthiness and reliability of an individual who is required to be fingerprinted under subparagraph (B).”

"(ii) any individual who is in the employ of the individual or entity described in subparagraph (A)(ii) (or a contractor or subcontractor of such individual or entity) and who has authority relating to provision of unescorted

access to a facility, radioactive material, or other property described in subparagraph (B)(i);" or

"(iii) any individual who is, or holds a position equivalent to, the principal operating officer, or alternate principal operating officer, of the individual or entity described in subparagraph (A)(ii)."

LEGISLATIVE MEMORANDUM

SEC. 2. HEARINGS UNDER ATOMIC ENERGY ACT OF 1954.

This section would eliminate the requirement of section 189 a. of the Atomic Energy Act of 1954 that the Commission hold a hearing in proceedings on each application for granting a construction permit for a nuclear reactor facility under section of 103 or 104 b. of the Act or for granting a construction permit for a testing facility under section 104 c. of the Act or for granting a combined construction and operating license under section 185 of the Act, even if no person whose interest is determined to be affected by the proceeding has requested a hearing or been granted intervention. Similarly, the requirement of section 193(b) of the Act that would require a hearing in an uncontested proceeding to license construction and operation of a uranium enrichment facility would be eliminated. In the latter case, the requirement that such hearings be on the record – the only such requirement with respect to an adjudicatory hearing contained in the Atomic Energy Act – would also be eliminated.

The Commission has found that there is not much added value in holding uncontested hearings. Over fifty years ago, a 1957 amendment added the requirement for mandatory hearings to the Atomic Energy Act of 1954. Since then, the means and methods for public access to the Commission's actions, both legally mandated and voluntarily undertaken, have become numerous and significant. Enactment of the Freedom of Information Act and the Government in the Sunshine Act, the advent of the internet, and web-based access to NRC's documented actions through the NRC's Agency-wide Documents Access and Management System (ADAMS) have all contributed to making NRC's actions transparent and accessible. Furthermore, even with the elimination of the mandatory hearing requirements, the agency staff

would continue to prepare a safety analysis report and an environmental statement, and the Advisory Committee on Reactor Safeguards would continue to provide an independent assessment of each power reactor application. The Commission could not issue a license until it had concluded that all regulatory requirements had been satisfied. And, of course, this would in no way affect the right of persons whose interest are affected from requesting a hearing on specific matters.

The changes in Commission licensing procedures addressed in this section would take effect upon enactment of the legislation, and would apply to new applications and proceedings, as well as any pending proceedings. This would obviate the need for the Commission to expend resources on uncontested proceedings.

These changes will streamline the Commission's licensing process under the Atomic Energy Act, saving time and scarce resources in a period in which a large number of reactor licensing applications are expected to be submitted to the Commission.

SEC. 3. REPORT ON EQUAL EMPLOYMENT OPPORTUNITY PROGRAM.

The Energy Reorganization Act of 1974 currently requires two annual program briefings of the Commission on the NRC's Equal Employment Opportunity (EEO) Program. These briefings involve extensive research and data-collection related to the agency's accomplishments, program assessments, and challenges, and are resource-intensive. History has demonstrated that the agency does not experience substantial changes in a six-month period and that annual briefings would be sufficient to keep the Commission apprised of the EEO and related programs.

To the Commission's knowledge, the NRC is the only Federal agency that is required to hold public briefings on the agency's EEO program. Holding only one briefing per year would not detract from the purpose of the EEO briefings, and would conserve agency resources.

Furthermore, this reduction would not negate the agency's efforts to ensure that equal employment opportunity is, as required by Executive Order 11478, an "integral part of every aspect of personnel policy and practice in the employment, development, advancement, and treatment of civilian employees in the Federal Government."

SEC. 4. CIVIL MONETARY PENALTIES.

This section would expand the Nuclear Regulatory Commission's authority to issue civil penalties. The Commission currently has authority, under section 234 of the Atomic Energy Act of 1954 (AEA), to issue civil penalties to licensees and certificate holders of the Commission. However, that authority only extends to violations of licensing or certification provisions listed in section 234 of the AEA (or any rule, regulation, or order, or any term, condition, or limitation of a license or certificate issued thereunder). The amendment would also clarify that contractors and subcontractors of a Commission licensee or certificate holder, or of an applicant for a Commission license or certificate, are subject to civil penalties.

Congress amended section 234 of the AEA in the Omnibus Consolidated Rescissions and Appropriations Act of 1996 (Public Law 104-134), to give the Commission authority to issue civil penalties for violations related to gaseous diffusion enrichment plants, which must receive a certificate of compliance from the Commission, rather than a license, under section 1701 of the AEA. That amendment made certificate holders subject to civil penalties, but only if the certificates were issued pursuant to one of the statutory provisions listed in section 234.

However, the current authority does not extend to all certificate holders. For example, certificates of compliance are also issued by the NRC for the design of spent fuel storage casks under provisions of the Nuclear Waste Policy Act of 1982 (NWPA). Since these provisions are not listed in section 234 of the AEA, the Commission does not currently have the authority under section 234 of the AEA to issue civil penalties based on these certificates of compliance.

Broadening the scope of section 234 of the AEA would authorize the Commission to assess civil penalties based on violation of any Commission regulatory requirement issued pursuant to, or contained in, the AEA or specified sections of the NWPA.

The proposed amendment is necessary to extend the Commission's civil penalty authority over holders of or applicants for certificates of compliance. There is no real basis to distinguish certificate holders from licensees for the purpose of allowing a civil penalty to be imposed as an enforcement sanction.

SEC. 5. ENHANCED FINGERPRINTING REQUIREMENTS.

Currently, NRC is required to direct certain individuals and entities (generally, those licensed or certified to engage in or who have filed an application for a license or certificate to engage in activities subject to NRC licensing or certification, or who have given written notice to the NRC of an intent to file an application for licensing, certification, permitting, or approval of a product or activity subject to NRC regulation) to require fingerprinting of individuals who have unescorted access to certain facilities or to designated materials or other property, or who are permitted access to safeguards information. This amendment would expand that authority with respect to certain other individuals who have security-related responsibilities.

For example, this amendment would authorize the Commission to extend fingerprinting requirements to any individual designated by a licensee or certificate holder to review the trustworthiness and reliability of individuals who are fingerprinted under section 149 a.(1) of the Atomic Energy Act of 1954, based on the results of the identification and criminal records check information obtained from the Attorney General. Because some licensees' reviewing officials or

Trustworthiness and Reliability Officials[1] do not have unescorted access to a utilization facility or to designated radioactive material or other property or access to safeguards information, the Commission currently is not able to require their fingerprinting.

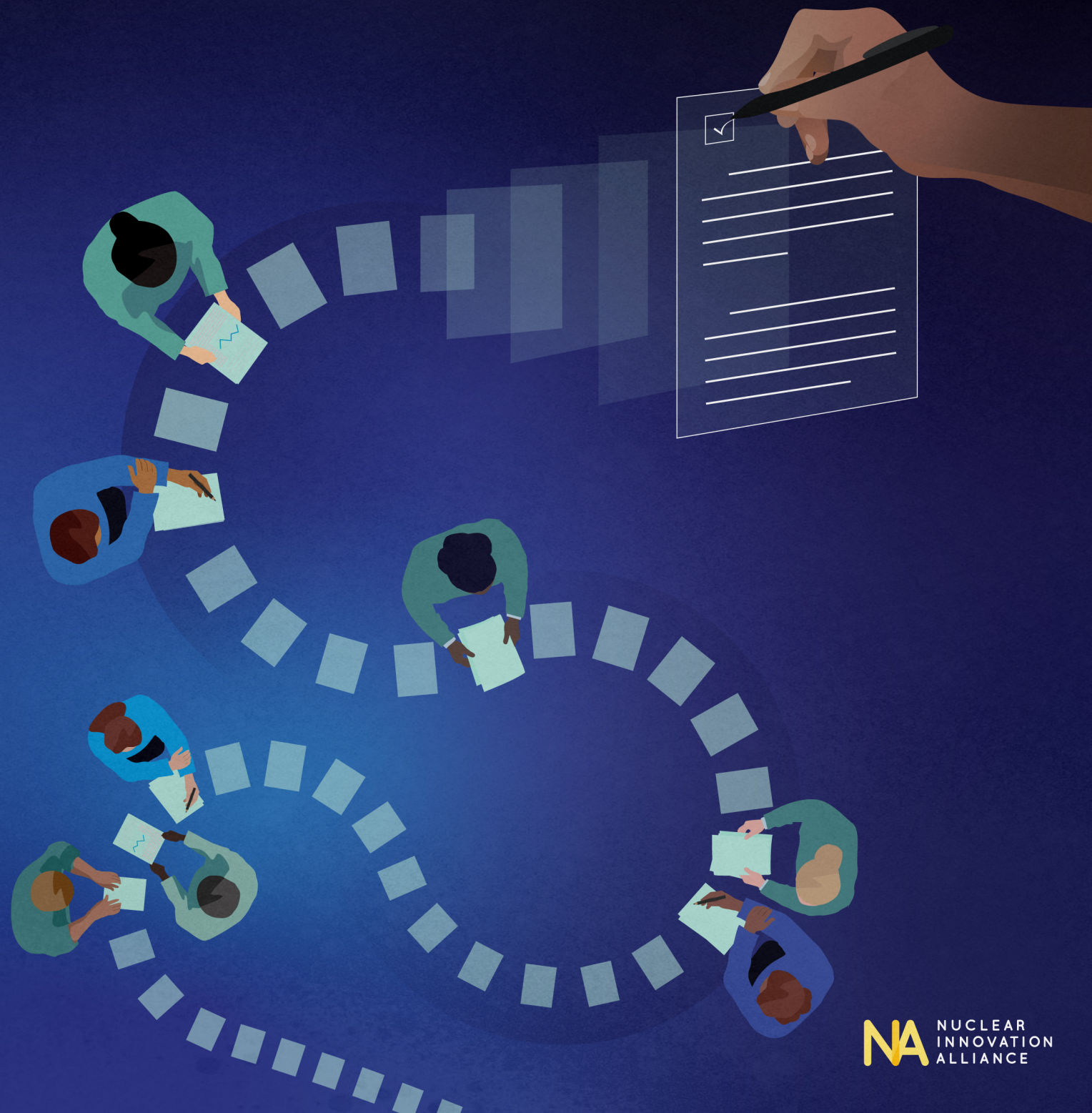
Other examples of individuals in positions that may be subject to NRC fingerprinting requirements under this amendment are individuals who have authority relating to provision of unescorted access to a facility, radioactive material, or other designated property, and individuals who hold the position of principal operating officer or an equivalent position in an enterprise. It is obvious that individuals who are employed in these types of positions can be in a position to do considerable harm. This amendment would enhance security by authorizing fingerprinting and a subsequent FBI criminal history check of those individuals.

The proposed amendment does not direct the Commission to immediately require fingerprinting of the individuals covered, but gives the Commission discretion to determine which of those employees and officers need to be fingerprinted and when such a program should be implemented.

[1] In this context, the terms “reviewing official” and “Trustworthiness and Reliability Official” are used to designate individuals who are assigned the responsibility for analyzing the results of identification and background checks based on the fingerprints of employees currently required to be fingerprinted under section 149 of the Atomic Energy Act of 1954.

Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards

March 2023



NUCLEAR INNOVATION ALLIANCE

Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards

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Acknowledgements:

The contents of this report are based on interviews with over thirty-five individuals, including current and several former members of the ACRS, current and former ACRS staff, several former NRC Commissioners, former NRC Staff, and members of the ACRS stakeholder community.

Disclaimer:

The views expressed herein are those of the authors and the Nuclear Innovation Alliance.

March 2023

This full report is available online at: https://nuclearinnovationalliance.org/resources

Contents

I. Executive Summary

The Nuclear Innovation Alliance's ("NIA's") previous report, *Promoting Efficient NRC Advanced Reactor Licensing Reviews to Enable Rapid Decarbonization*,[1] suggested that "the Commission should systematically evaluate the [Advisory Committee on Reactor Safeguards] ACRS review process and how this can be appropriately aligned with the expectations that Congress set out for the Commission under [Nuclear Energy Innovation and Modernization Act ("NEIMA")]."[2] In light of this suggestion, NIA undertook its own extensive review of the ACRS to determine how it should better align with Congressional expectations under NEIMA without diminishing the significant role the ACRS has in the review and resolution of key technical issues associated with nuclear power plant regulation. Based on this review, the authors produced four main recommendations accompanied by specific proposed solutions. These recommendations broadly align with ACRS' own suggestions for the self-transformation presented to the Commission in 2019.[3] A brief description of each overarching recommendation and the takeaways from that recommendation are described briefly below.

1. The first overarching recommendation is to "Re-focus the Scope and Depth of ACRS Reviews."

In accordance with this recommendation, the ACRS should:

- focus on safety-significant matters and assist the NRC in meeting its statutory mandate to determine "that there is reasonable assurance"[4] "that the utilization or production of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public."[5] (pg. 14)
- increase training, focus the scope of reviews, and use an action plan to further prioritize matters needing review. (pg. 15)
- consolidate duplicative Full Committee and Subcommittee meetings. (pg. 18)
- provide dates in the schedule for placeholder meetings. (pg. 18)

The Commission should:

- direct the ACRS to focus on novel and safety-significant issues in its reviews, and potentially refer specific matters to the ACRS with novel technical issues prior to review. (pg. 15)

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[1] Alex Gilbert, *Promoting Efficient NRC Advanced Reactor Licensing Reviews to Enable Rapid Decarbonization*, Nuclear Innovation Alliance (2021), *available at* https://nuclearinnovationalliance.org/licensingdurationsforclimatemitigation.

[2] *Id.* at 18.

[3] *See e.g.*, Letter from Peter C. Riccardella, Chairman of NRC Advisory Committee on Reactor Safeguards to Kristine Svinicki, NRC Chairman (Oct. 17, 2019), available at https://www.nrc.gov/docs/ML1929/ML19290F956.pdf (hereinafter "ACRS Transformation Letter"); ACRS, *Commission Meeting with the Advisory Committee on Reactor Safeguard (ACRS)* (Dec. 6, 2019), available at https://www.nrc.gov/reading-rm/doc-collections/commission/slides/2019/20191206/staff-20191206.pdf.

[4] AEA at § 185(b).

[5] AEA at § 182(a).

- establish timelines and milestones for ACRS reviews. (pg. 16)
- have OGC available to assist the ACRS in understanding the agency's statutory mandate. (pg. 16)
- communicate topics of interest to the NRC Staff in advance of meetings. (pg. 17)
- establish a hard deadline for the NRC Staff to provide documents in advance of the meetings and allow the meeting date to slip if the NRC Staff fails to meet its deadline. (pg. 17)
- exercise greater discipline on itself to limit the demands it places on the Staff to what is essential to ensuring adequate protection. (pg. 17)

The NRC Staff should:

- improve its preparation for engagements with the ACRS to better optimize the review of topics. (pg. 16)
- review its own practices in engaging with the ACRS, identify best practices that lead to efficient and effective ACRS reviews, and promote those best practices. (pg. 16)
- provide the ACRS with documents sufficiently in advance of ACRS meetings to allow for a fulsome review. (pg. 20)
- communicate the portions of the review that have the greatest potential safety significance. (pg. 20)
- engender a culture where the NRC Staff can feel empowered to raise concerns that the Committee is raising issues that are not safety significant. (pg. 20)

Finally, Congress should:

- revise the ACRS' statutory mandate in the Atomic Energy Act to emphasize that the ACRS should review only novel and safety-significant issues, and remove the requirement that the ACRS review all construction permit and operating license and renewal applications. (pg. 16)

2. The second overarching recommendation is to "Improve ACRS Operations and Management."

In accordance with that recommendation, the ACRS should:

- keep itself to approximately ten members. (pg. 21)
- diversify the background of ACRS members (drawing from former industry members, academics, and former national lab personnel or consultants). (pg. 22)
- relax experience requirements in certain areas of new state-of-the-art technology (e.g. artificial intelligence). (pg. 22)
- adhere to term limits. (pg. 22)
- not allow a single member to dominate the conversation for a particular subject area. (pg. 24)

The Commission should:

- implement the above suggestions for the ACRS to the extent that the ACRS cannot do so. (pg. 23)
- hire a consultant with expertise in organizational effectiveness to evaluate the manner in which ACRS members engage with the NRC Staff and licensees and suggest options for training and best practices on public and peer engagement. (pg. 25)
- incorporate components that screen for individuals who are independent yet collaborative and collegial when selecting ACRS members. (pg. 24)

The Executive Director for Operations in coordination with the ACRS should:

- not allow the ACRS to criticize, badger, or undermine individuals who are unable to answer ACRS questions on the spot. (pg. 24)
- request that ACRS members be able to set forth a brief explanation for why they are asking a question and tie it back to regulation (i.e., what is the member trying to understand and what is the safety concern). (pg. 24)

The ACRS Chairman should:

- ensure that debate among ACRS members is constructive, collegial, and within the ambit of its statutory purpose. (pg. 24)
- ensure that the views of individual ACRS members do not unduly chill or influence the views of the NRC Staff. (pg. 24)
- provide and maintain a safe space for respectful disagreement. (pg. 24)

3. The third overarching recommendation is "Reduce the Cost of ACRS Reviews."

In accordance with that recommendation, Congress should:

- amend the Atomic Energy Act to provide that all costs associated with ACRS reviews, including the cost of ACRS time be excluded from the fee recovery requirement. (pg. 25)
- amend the Atomic Energy Act to provide that all NRC Staff time used to prepare for ACRS meetings should not be billed to licensees and should also be excluded from fee recovery. (pg. 25)

4. The fourth overarching recommendation is to "Adjust Management of the ACRS."

In accordance with that recommendation, the Commission should:

- be more involved in the screening and selection of individual candidates who possess the knowledge, skills, and abilities necessary to address keys topics before the NRC. (pg. 26)
- be more involved in selecting or identifying the ACRS Chair and engage with the ACRS Chair on a regular basis. (pg. 26)
- provide the ACRS information on topics requiring ACRS review, particularly those that are novel or have significant safety implications. (pg. 26)

- discuss budgeting and prioritization with the ACRS. (pg. 27)
- set much of the agenda for the semi-annual meetings with the ACRS. (pg. 27)
- revamp the way that it interacts with the ACRS in meetings by eliminating meetings solely focused on repeating written material in paper filings. (pg. 27)
- ensure the ACRS Executive Director position is always filled by a seasoned executive who has technical credibility and sufficient weight and standing within the Commission to push back against the NRC Executive Director of Operations as well as the ACRS Chairman and members, and who has the experience needed to garner respect, as well as the savvy needed to deal with various disparate personalities. (pg. 27)
- perform a budget review of the ACRS staffing needs to ensure the Executive Director's organization is appropriately staffed to ensure it can meet the anticipated bow-wave of new reactor reviews. (pg. 27)

The authors' hope is that these recommendations (or some semblance thereof) will be implemented to position ACRS and NRC to successfully enable safe deployment of advanced nuclear energy.

"Reinvigorating the Nuclear Regulatory Commission by Reflecting on its Mission"

Remarks of Jeffrey S. Merrifield, Partner - Pillsbury Winthrop Shaw Pittman
ANS Annual Meeting – June 13, 2023

I would like to thank Steven Arndt, Craig Piercy and the American Nuclear Society for asking me to speak today. I am grateful for the opportunity.

On January 6, 1986, I began my first day of work in the United States Senate for Gordon J. Humphrey of New Hampshire, my home state, and the very first thing I worked on was issues associated with the construction of Seabrook Station Nuclear Power. Through 10 years in the Senate, nine years as an NRC Commissioner, 7 years as an NRC licensee, and for 8 years serving as the head of Pillsbury Law Firm's nuclear practice, my entire 37-year career has been intrinsically interwoven with the Agency and its policies.

Being an NRC Commissioner was one of the best jobs I have ever had and to this day, and I embrace the motto of the Agency – "Protecting People and the Environment" – a tagline I helped craft. I believe the Agency is staffed by talented, bright, well-meaning and dedicated civil servants, and I firmly believe in the mission of the Agency and the value of its independent role. I also know and respect the senior managers and Commissioners, who I know are committed to trying to do the right thing to protect public health and safety.

With that preface, I believe the Agency has lost its way.

As an attorney, I am reminded of the old saw, "when in doubt" look at the law.

In Title I, Chapter 1, Section 1 of the Atomic Energy Act of 1954 it declares:

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

While those words were passed into law in 1954, almost 70 years later they ring true today and remain the law of the land. At a time when global climate change is a real and present threat to our common defense and security and given that nuclear energy is the only non-carbon, proven, energy system that can reliably deliver 24x7 energy, enabling its safe usage is an obligation of the NRC under the Atomic Energy Act and Energy Reorganization Act.

In my opinion, the NRC of 2023 fails to fully recognize the positive encouragement of nuclear energy that the Atomic Energy Act put into place that frames its oversight activities in overseeing the safe use of nuclear energy in our country. Instead, it is overly conservative and does not consistently apply common sense principles in regulating the technologies it oversees. I think the current impasse on creating a new regulatory framework for Advanced Reactors under Part 53 is the most recent example of this gap. As the late Commissioner Ed McGaffigan,

who I respected greatly, frequently stated, the Agency's mission is to "provide reasonable assurance of adequate protection, not absolute protection."

So how did this come to pass?

First, I think the Agency has a culture challenge. From where I stand, the roots of the Agency's issues go back to the late 2000's when the NRC was dubbed one of the "Best Places to Work" in the Federal Government, and even more recently when the Agency began to be referred to as the "Gold Standard of Nuclear Regulators" – a term I personally dislike. I believe these concepts fostered a trend of complacency and self-satisfaction of the type that the Agency would have found unacceptable in one of its regulated entities. While the Agency continued to claim that it too, had a self-questioning attitude and sought continual improvement, I do not believe this is consistently the case today.

I visited Palo Verde Nuclear Station toward the end of my final term on the Commission, during a time when the former INPO 1 plant had slid several tiers in the NRC's action matrix and was demonstrating repeated performance issues. As I stood in the cafeteria of the plant giving an allhands meeting, I remarked that the plant had developed a complacent attitude and the INPO 1 flags hanging around the room no longer reflected the performance of the facility – just its past history. To his credit, Bill Post, who was the CEO of Arizona Public Service at the time, and who was watching my remarks, ordered the flags to be taken down that very afternoon.

In a similar vein, I do not think the Agency is currently performing at a "Gold Standard" level and I would recommend that such references should be avoided by the Commission and its staff.

Another contributor to this adverse cultural trend is the administration of the differing professional opinion process by the senior executives of the Commission. Having lived through the Davis Besse event, and having

learned the lessons of the NASA Challenger Accident, I am well aware of the vital importance of allowing minority views to be heard and considered. We were committed to that goal when I was a Commissioner and I remain a strong proponent of that process to this day.

But, the intention of the DPO process is not to give minority views a veto to the regulatory review. DPOs should be heard, evaluated and acted upon promptly, even where the DPO does not carry the day. Ultimately, the NRC is a hierarchical organization, and senior managers must make difficult calls. Unfortunately, some NRC managers today go well out of their way to avoid DPOs, even if not justified by the regulations or the safety case. This reticence causes the regulatory process to bog down and results in the imposition of unnecessary cost and delay for the regulated licensees. In my view there needs to be much more balance in the process.

Similarly, I have heard from many licensees that the Agency staff states that it is limited in what it can say to applicants seeking clarification of Agency rules and guidance as the NRC can't act as a "consultant" due to its independent safety mission. Really?

There is absolutely nothing wrong with the Agency providing clarifications, and assistance to licensees attempting to understand and meet the complex, difficult and sometimes inscrutable guidance and rules of the NRC. Responding to questions, engaging with licensed entities with direct and fulsome responses, is the responsibility of the Agency, and it should not hide behind its role as an "independent" safety regulator.

A second area of concern is the technical prowess of the Agency, including a diversity of experience and background.

When I came to the Agency in 1998, we had a wide range of staff who had previously served in the Atomic Energy Commission, the Army and Navy Reactor Programs, the Department of Energy and its National

Labs, and individuals with experience in the industry. Many of these individuals had experience in operating reactors so they brought with them a well-rounded background which helped foster the positive regulatory record that the Agency developed in the early 2000's which resulted in significant improvement in Agency and industry performance and an embrace of risk informed regulation.

There are many individuals who have worked at the NRC for the entirety of their careers and done exceptionally well, but I do believe there are too many women and men at the Agency who lack other diverse experience, resulting in a significant amount of insularity of thought and process within the agency. With the rate of retirement that has taken place at the Agency, this diversity of experience is being further eroded, and I believe the NRC now lacks the breadth and depth of technical expertise that was present when I was a Commissioner.

In my view, far too many of the seniormost members of the NRC leadership, particularly those in technical roles, lack experience outside the Agency, and I think this makes it very difficult for the NRC to receive the diversity of thought, experiences and innovation that is needed. I applauded when former Chairman Christine Svinicki, with support from the Commission, selected Ray Furstenau, formerly at the DOE Office of Nuclear Energy, to be the Director of the NRC Office of Research. I think that was an outstanding idea and Ray has brought new ideas and a new outlook which has helped to improve that important organization and the work it provides.

So how do we address some of these issues?

First, I think the Agency needs to receive the authority from Congress to pay higher wages to its workforce, similar to the exception made for the Securities and Exchange Commission and allow the Agency to recruit exceptional talent and pay them at more market-oriented rates of pay.

Second, the Agency needs to focus on skills diversity and widen the net of individuals who should be brought into the NRC. Individuals who

served in industry, DOE, the military and elsewhere should be considered as candidates for every position within the Agency.

Third, the Agency needs to take a more robust effort to provide training, outside of the Agency, and frankly outside of the nuclear regulatory arena, to allow greater insights to create a workforce that is innovative, effective and efficient in their duties as regulators.

Finally, the Agency should consider, indeed perhaps, be required to consider at least one non-NRC and non-governmental candidate for each senior executive position within the Agency. While a lifetime of work at the NRC is not a bad thing, and indeed should be commended, it is beneficial for every organization, big or small, to have a diversity of thought and experience, and the NRC is no exception to that rule.

Another area I would touch upon, as an attorney, is the Office of General Counsel. The role of an attorney is to explain the law to their client, provide alternatives and make well-reasoned recommendations that the client is free to accept or reject. As a Commissioner, I benefited from the fact that Karen Cyr, who has an outstanding legal mind, served as the General Counsel. Karen was not afraid to disagree with my opinions, but she consistently tried to identify options for the Commission to achieve its objectives within the law, not just tell the Commission no.

There were circumstances where the Commission chose to take a legally riskier path, with the potential that we might not prevail in court, but we did so because it was the right thing to do. But that was the decision of the Commission. The Office of General Counsel is an advisor, not a gatekeeper. Their recommendations should be based on meeting the Agency's mission, consistent with the Atomic Energy Act, and not be unduly retarded by a fear that the Agency's longstanding track record for prevailing in court could be threatened. That is the same relationship OGC should have with the other parts of the NRC staff, and the Commission, not OGC, should be the final arbiter of how the Agency should proceed in its mission and policies.

Marian Zobler the General Counsel of the NRC will be retiring later this year. She has been a dedicated public servant and I have known and liked her since she served as Dick Meserve's legal counsel in the early 2000's. I think her departure will provide an opportunity for the Commission to take a fresh look at OGC and the role it plays in meeting the Agency's mission. As I stated earlier, I believe outside candidates should be considered for that role of the General Counsel, including individuals who have served as attorneys in the nuclear industry.

Finally, you may ask, what are my thoughts about the Commission itself?

As a former Commissioner, I think I have a deep understanding of the roles and responsibilities of the Commission, and thus have the license and frankly, the duty, to be clear in my concerns and thoughts.

I know and respect each and every one of the members of the Commission who are serving today. To a woman and man, I believe each believes they are fulfilling the oath to the Constitution that they repeated when they were first sworn in as Commissioners. That said, I think there are a few things the Commissioners should keep in mind.

Looking back at my votes over 9 years on the Commission, I am proud to say I did not cast a single vote on a party line driven basis, nor did I consult with either the executive or legislative branch on how I should turn out on a given issue. Commissioner Ed McGaffigan, with whom I served my entire term, and who was a Massachusetts born and bred Democrat, was someone with whom I voted almost all the time. While we had our differences of opinion, and while we most certainly had different political points of view, we did not let those differences, nor our respective political friends, let us influence how we came out in our safety decisions.

Additionally, as one thinks about an independent regulator, I always remind folks that Commissioners are independent not just from the companies and individuals that the Agency regulates. The NRC was

created to be independent from licensees, the White House, Congress, the public, the states, non-governmental organizations, and yes, independent of the NRC staff. The job of a Commissioner is to make tough decisions, much like that of an umpire, and while each member of the Commission should listen to a diversity of voices, at the end of the day the call that they make must be independent from ALL outside influence.

Beginning with Shirley Jackson, Dick Meserve, Nils Diaz, Pete Lyons, Greta Dicus and Dale Klein, I served with a variety of individuals, Democrats and Republicans, who brought strong technical expertise to the Commission, and others of us, like Ed and I, provided a balance of policy and technical background. Maintaining that balance is important. While I believe all the currently serving Commissioners are outstanding individuals, the Commission as a whole, today, does not possess this same level of technical diversity and balance as was the case for the Commissions on which I served.

Now, whose fault is it that we are in this position?

Well, certainly not the Commissioners themselves.

It is the fault of the Office of Presidential Personnel, which through the Obama, Trump and Biden Administrations has failed to put sufficient priority on identifying a diversity of expertise on the Commission.

Since Harry Reid was the Senate Majority Leader, successive Administrations have given a virtual veto to the Nevada delegation on who is qualified to serve as an NRC Commissioner. While I understand the continued concerns about Yucca Mountain, that matter should not be a litmus test for membership on the Commission.

Going forward, the White House and the Senate Majority and Minority Leaders who influence the membership of the Commission should focus on identifying individuals who are diverse in all ways, including technically, and who understand the Agency's mission is to enable the

safe use of nuclear energy to provide for the common defense and well-being of our nation.

As I close, I don't want to leave folks with the wrong impression. I am a huge supporter of the NRC and embrace its vital mission. I am proud to be an alumnus of the Agency. I also believe the Agency needs to look at itself in the mirror, recognize that it has a role in enabling nuclear technologies to provide for our common defense and security, and ensure that it is working to become a more efficient, effective, riskinformed, timely and technically adept regulator. I believe the Agency is capable of achieving those goals, and I fervently hope that it does.

Thank you,

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May 5, 2023

Honorable Cathy McMorris Rodgers
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2125 Rayburn House Office Building
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Honorable Frank Pallone Jr.
Ranking Member
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Honorable Jeff Duncan
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Honorable Diana DeGette
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Honorable McMorris Rodgers, Pallone Jr., Duncan, and DeGette:

On behalf of the men and women of the nuclear professional community, I am pleased to respond to your request for information regarding the U.S. Nuclear Regulatory Commission's licensing and regulatory processes for advanced reactors.

Established in 1954, the American Nuclear Society is the premier scientific organization for U.S. nuclear professionals. Our 10,000+ members have dedicated their careers to the peaceful use of nuclear science, engineering and technology for the benefit of humanity, and we serve our community by hosting scientific conferences, publishing technical journals, promulgating ANSI-certified standards, and providing professional development and leadership programs. ANS also supports activities aimed at broadening the public's understanding of nuclear science and technology, including K-12 Nuclear STEM education in classrooms and the dissemination of up-to-date, unbiased and technically sound information and insights on nuclear topics to journalists and policymakers.

In order to properly consider the question of how to improve the NRC licensing review and approval processes for advanced reactors, it is important to first provide some context. Earlier this spring, the NRC hosted its first in-person Regulatory Information Conference (RIC) since the onset of COVID. It was a well-organized event, and the plenaries and sessions were informative. However, it was hard not to sense a level of frustration in the hallways over the stringency of NRC's proposed Part 53 regulatory framework for advanced reactors; the perceived lack of preparedness for a coming onslaught of license applications, as well as a general sense that, as one friend put it, the Commission is "wrapped around the axle of administrative procedures and precedents".

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Of course, one must always view these criticisms through a filtered lens. Yes, the regulatory process is cumbersome, but nuclear technology is serious business. Yes, it's fair to argue that regulatory uncertainty is holding advanced nuclear back to some degree, but so are a host of other challenges that include project financing, siting, workforce, supply chain, and fuel availability. At any given moment, it is impossible to determine with certainty which of these headwinds are strongest. Still, there's no denying that, at least from a timing standpoint, improving NRC efficiency needs to be at the front of the line, because solving the regulatory challenge enables solutions for the others.

It is also important to remember that, in the nearly 70 years since the inception of the U.S. commercial nuclear industry, no member of the public has been killed or injured by the operations of a reactor. In that time, nuclear energy has offset billions of pounds of environmental pollutants like Sox, Nox, and fine particulates that otherwise would have caused millions of premature deaths. We challenge anyone to find a better safety record in any other industrial sector; and the NRC deserves a healthy share of the credit.

Now add the growing human and environmental impacts of climate change (using even the tamest prognostications) and any honest debate about our approach to nuclear safety has to consider the question "How many lives will we sacrifice by not acting with urgency?"

As your letter points out, federal law gives NRC the authority to consider the overall benefits of nuclear as part of their licensing and regulatory activities. We believe NRC needs to formally reframe its mission in a manner that aligns more closely with the original precepts of nuclear regulation set forth in the Atomic Energy Act of 1954, specifically its mandate that the "development, use and control" of nuclear energy be conducted in a way as to "improve the general welfare."

A clear-eyed recognition of the net positive public health impacts of nuclear energy by NRC does not equate to "promotion." The modern case for nuclear safety demands a holistic approach, one that operationalizes the urgency of the moment, applies risk assessment in the broadest possible scope, and defines the "public good" as the-most-good-for-the-most-people. This kind of recognition by NRC leadership would not require the agency to make wholesale changes to its regulations or processes, but it would send a powerful signal, both internally and externally, that timeliness in its licensing and regulatory actions is a central tenet of NRC's mission.

The lack of a bias to action on the part of the NRC can clearly be seen in the agency's inability to complete rulemaking in anything resembling a timely manner. Periodically, the NRC needs to adapt its regulations to account for new information and changed circumstances, address new regulatory issues, and incorporate lessons-learned in carrying out regulatory activities. However, at the NRC regulatory changes languish for years or even decades. One example is the sorely needed decommissioning rulemaking which the Commission kicked off in 2014, but which continues to churn

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nearly a decade later (reference - https://www.nrc.gov/waste/decommissioning/reg-guides-comm/regulations/reg-improv-trans-to-decom.html).

Another example is the stalled rulemaking on low-level waste that began with public workshops in 2009 and progressed to a proposed rule in 2015, but has yet to come to fruition (reference - https://www.nrc.gov/waste/llw-disposal/llw-pa/uw-streams.html). Rulemaking should be a routine part of doing business; however, the agency and its stakeholders have come to see it as an activity of last resort with little or no chance of success. The results are inefficient workarounds and regulatory ossification.

We also encourage the Committee to consider the behavioral implications of NRC's current financial structure, where an overwhelming majority of its monetary receipts come from its licensees, and advanced reactor developers pay for NRC licensing activities on a per person, per hour basis, similar to a law, or other professional services firm. This fee structure is bound to negatively incentivize NRC staffing decisions, even if subconsciously, leading to staff resource over utilization, excessive focus on non-safety-significant issues and overly delayed licensing timeframes. In an ideal world, NRC license application fees would be fixed, consistent and transparent like other federal regulatory agencies, such as the U.S. Food and Drug Administration.

As to specific NRC reforms, we encourage the Committee to carefully consider the recommendations included in the Idaho National Laboratory's report: "Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process." INL/RPT-23-72206. In addition, we encourage the Committee to review the recently introduced ADVANCE Act of 2023, S.1111, especially the provisions regarding enhanced compensation pathways for highly skilled and experienced technical employees.

In closing, we appreciate the Committee's interest in this very important set of issues, and look forward to providing you with any additional information you may require.

Sincerely,

Craig H. Piercy

Executive Director and CEO
American Nuclear Society

Breakthrough Institute's comment on the House Energy & Commerce Committee's RFI

Suggestions for Nuclear Regulatory Modernization

The Breakthrough Institute (BTI) appreciates the opportunity to comment on nuclear energy regulation. BTI is an independent 501(c)(3) global research center that has advocated for the new and continued use of clean, reliable nuclear energy for years. As part of this, we have been heavily engaged with the Nuclear Regulatory Commission (NRC). Through these interactions, BTI has recognized that there are some important changes that need to be made at the NRC in order to enable nuclear energy to reach its full potential. BTI acts in the public interest and does not receive funding from industry.

I. Introduction

Leadership in new nuclear technologies will significantly benefit America's energy future. Advanced nuclear reactors are versatile, reliable, long-lasting, land-efficient, resource-efficient, geopolitically secure, and scalable sources of clean energy. Bold investments in advanced nuclear technologies in the United States will advance technological innovation, secure US leadership in international nuclear markets, and support national energy security and electricity grid resilience, all while improving environmental health and accelerating US climate action.

However, forging a promising future for the domestic advanced nuclear sector will require increased investment and policy support. Such efforts will generate far-reaching national benefits in both the near-term and long-term.[1]

To assist with the deployment of new nuclear reactors, Congress passed landmark legislation that will position the U.S. toward regaining global leadership in advanced reactor deployment. This includes the Nuclear Energy Innovation and Modernization Act (NEIMA) of 2019 which aims to modernize regulation. If implemented properly, these laws will propel the U.S. in the right

[1]See BTI's July 2022 Advancing Nuclear Energy report accessible here: https://thebreakthrough.org/articles/advancing-nuclear-energy-report

direction. However, there is clear hesitance or resistance from the NRC to adjust agency practices to comply with NEIMA. Further policy support is needed to modernize the NRC.

As one of the leading public interest organizations in the nuclear regulatory space, BTI has a unique outlook on the current landscape of regulatory challenges that inhibit progress toward effective and efficient licensing and regulation of advanced nuclear technologies. The flowchart in Figure 1, highlights the regulatory challenges that BTI has identified as current barriers to entry, as well as categorizes these challenges by priority. The remainder of this comment will cover these challenges in detail, as well as propose solutions that could address said challenges.

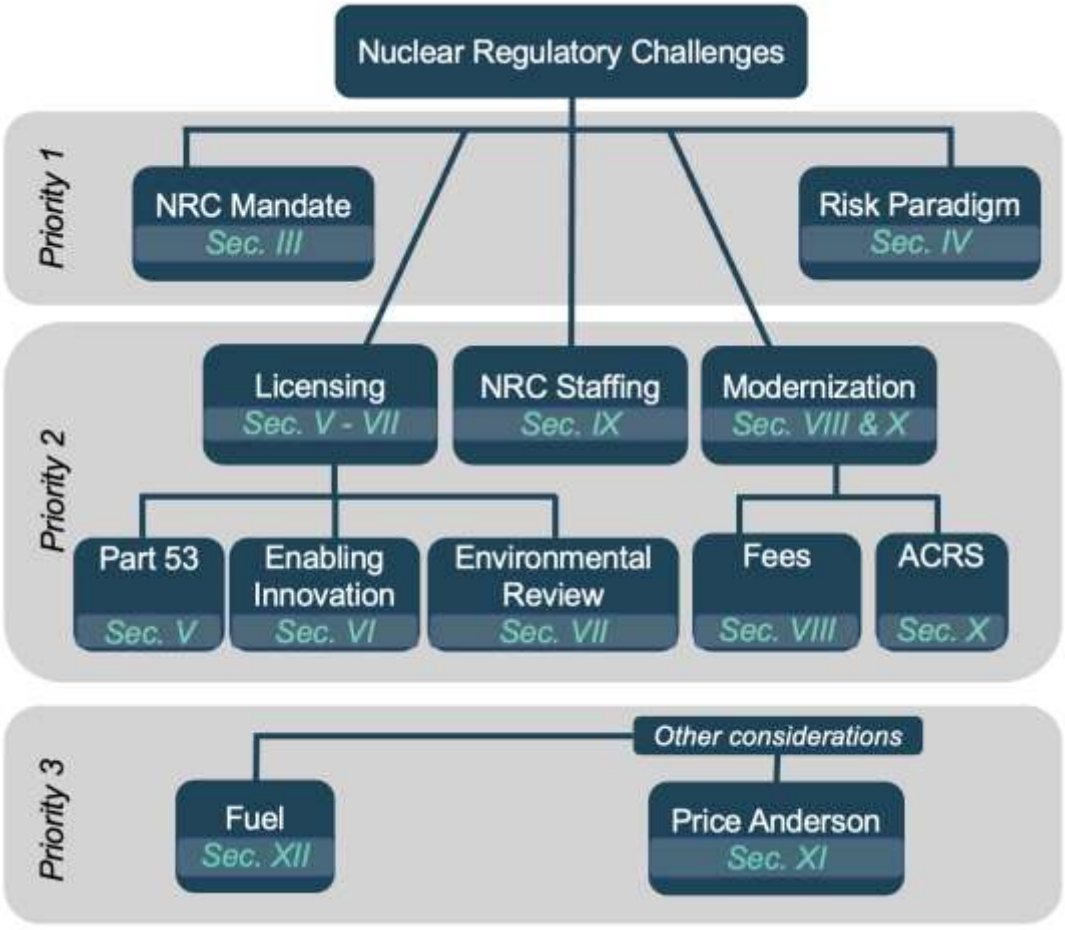

Figure 1. An overview of BTI's perspective of regulatory challenges plaguing the NRC. The figure also identifies these challenges by priority and directs the reader to their respective sections in this comment..

II. Overview

The Nuclear Regulatory Commission is arguably one of the most important federal agencies that could enable rapid decarbonization and bolster the security and resilience of the U.S. energy infrastructure system. But to position itself as a global model for effective and efficient licensing of advanced reactors, there are several considerations and adjustments necessary to reach its full potential. BTI has identified and binned key priorities for regulatory modernization at the NRC.

Priority 1

- The NRC needs to recognize its full mandate and consider more than just the nuclear safety aspects of licensing a reactor.
- The NRC's risk tolerance is unnecessarily strict and inconsistent with other federal agencies

Priority 2

- Advanced nuclear reactors will require efficient licensing to be successful
- The fee structure of the NRC limits innovation and rapid deployment
- The Advisory Committee on Reactor Safeguards (ACRS) is quickly becoming a bottleneck to licensing new reactors
- The NRC will require more staff as the number of reactor applications increases

Priority 3: Other considerations

- To minimize market uncertainty, the Price Anderson Act should be extended by at least 40 years
- Securing fuel supply for new and advanced reactors is critical to advanced reactor deployment in the U.S.
- Progress towards spent fuel reprocessing and/or disposal will require regulatory readiness and transparency

III. Priority 1: NRC's restricted application of a broad mandate

Problem/Challenge. Through the Energy Reorganization Act of 1974, the NRC inherited its licensing and regulatory authority from its predecessor, the Atomic Energy Commission (AEC).[2] Specifically, the NRC's legal mandate is[3]:

> *The Congress hereby declares that the general welfare and the common defense and security require effective action to develop, and increase the efficiency and reliability of use of, all energy sources to meet the needs of present and future generations, to increase the productivity of the national economy and strengthen its position in regard to international trade, to make the Nation self-sufficient in energy, to advance the goals of restoring, protecting, and enhancing environmental quality, and to assure public health and safety.*

Despite this broad mandate for the benefit of the nation, the NRC has a self-defined mission that is almost solely focused on a high level of nuclear safety: to regulate "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."[4] This is significantly pared down from its statutory mandate and creates barriers that unnecessarily delays nuclear reactor licensing Consequently, BTI recommends that Congress reiterate the breadth of factors that the NRC should consider.

Proposed Solution. Congress should amend Section 202 of the Energy Reorganization Act of 1974 to make it explicitly clear that the NRC mandate is in line with the overall objective of the Act. This will direct the NRC to consider the broader costs and benefits of regulatory actions on society.[5, 6] While the NRC does consider the potential negative public health impacts of using nuclear power, it does not consider the consequences to public health and safety when nuclear

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[2] The Energy Reorganization Act of 1974 divided the powers of the AEC: the "licensing and related regulatory functions" were passed down to the NRC (Sec. 2(c)) and the other powers including promotion of nuclear power were given to a different agency which later became the Department of Energy. The Act can be read here: https://www.nrc.gov/docs/ML1327/ML13274A489.pdf

[3] Energy Reorganization Act of 1974 Sec. 2(a).

[4] "About NRC." NRC Web. https://www.nrc.gov/about-nrc.html

[5] Additional examples of federal agency missions have been compiled here: https://thebreakthrough.imgix.net/Agency-Mission_Vision-Statements.pdf

[6] The Environmental Protection Agency (EPA) considers the broad impacts to society, economics relative to the regulation, and available technology, not just the cost to reduce the exposure.

deployment is impeded by overly restrictive standards. Further, the NRC's safety goal policy[7] states that nuclear energy risks should be considered relative to other energy sources. However, the NRC does not actually make this comparison in decision-making.

The NRC could serve to directly reduce public health and environmental impacts and has the potential to be the most important Federal agency for addressing climate change and enabling clean energy. This limited scope for cost-benefit analysis significantly impedes or outright prevents the NRC from even considering its role in these important issues for society. To remedy this issue, Congress should clarify the mandate of the NRC to direct the agency to bring its mission into alignment.

IV. Priority 1: Reconsideration of NRC's risk paradigm

In addition to a reconsideration of the NRC's mandate, the NRC will also need to modify the current risk paradigm towards a safe yet realistic approach. One key approach to an evaluation of the current risk paradigm is to consider a more holistic set of factors, including risk relative to the deployment of alternative energy sources like fossil fuels. This section highlights the challenges with the current and proposed risk paradigm. If left unaddressed, this paradigm could have long-term and far-reaching implications that would significantly detour the U.S. from a path of global dominance in advanced reactor deployment.

1) Quantitative Health Objectives

Quantitative health objectives (QHOs) are safety goals, not a requirement of existing licensing frameworks. The QHOs are currently used to measure the effectiveness of regulations. They set a limit to health risks - latent cancer and prompt fatality - from nuclear power plants.

Problem/Challenge. Currently, the NRC staff is attempting to codify the QHOs, which are currently only guidance, by incorporating QHOs into the draft Part 53 rule. This is despite numerous past Commission decisions that the QHOs and other safety goals should not be codified as regulations but should remain goals that inform staff on how to apply regulations. The QHOs meet very few

[7] The NRC's top line Safety Goal is that, "Societal risks to life and health from nuclear power plant operation should be comparable to or less than the risks of generating electricity by viable competing technologies and should not be a significant addition to other societal risks" https://www.nrc.gov/reading-rm/doc-collections/commission/policy/51fr30028.pdf

of the NRC guidelines for a performance-based metric. Critically, they are neither calculable nor measurable in a feasible sense. The level of risk defined by the latent cancer QHOs is **not statistically observable** in the population of a large 10-mile emergency planning zone (EPZ) even with long-term observation.[8] Further, the NRC-defined QHOs are orders of magnitude more strict than similar metrics at other federal agencies, such as the EPA, which both Congress and the Court have upheld.[9] BTI published a detailed analysis[10] of the implications of enforcing QHOs as a requirement in the licensing framework, included in Attachment A.

Proposed Solution. The Commission should maintain consistency with prior decisions and direct staff against using QHOs as a requirement in the proposed Part 53 draft. QHOs have been safety goals in existing licensing frameworks. The proposed shift to include QHOs, or other new metrics, directly in the proposed Part 53 licensing rule would generally be only justified if and only "***if*** *NRC or licensee operations benefit from such a change."*[11] [emphasis added].

2) Theoretical risk that cannot be observed epidemiologically is below regulatory concern

Problem/Challenge. Because the NRC is narrowly focused on safety risk, it has consequently developed a series of metrics and standards by which to judge reactor performance that is, at best, unobservable in a large exposed population, and at worst, based on impossible assumptions. This would inevitably create excessive and unnecessary regulatory burdens.

Proposed Solution. Congress should explicitly define a threshold for radiological risks associated with licensing advanced nuclear reactors that is sufficient to maintain public safety. Such a threshold could be:

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[8] See BTI's whitepaper on the NRC's Quantitative Health Objectives https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22038A112

[9] Congress later codified the risk standard used by the EPA for Benzene, thereby authorizing the discretion of the EPA to consider costs and to determine that constitutes an acceptable risk threshold. See *Natural Resources Defense Council v. EPA*, 529 F.3d 1077, 1082 (D.C. Cir. 2008).

[10] See https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22038A112

[11] Federal Register. Revised High-Level Guidelines for Performance-Based Activities: https://www.federalregister.gov/documents/2000/05/09/00-11535/revised-high-level-guidelines-for-performance-based-activities

> *The threshold is defined as negative health consequences as a result of the operation of a nuclear power facility that would be epidemiologically observable in the population in the vicinity of the facility.*

Congress needs to set a standard for radiological risk because the NRC uses far stricter standards than other federal agencies[12] that are not observable even in exposed populations. There are three major examples of illogical or imperceptible requirements that the NRC staff has either recently created, or has proposed their codification in the 10 CFR Part 53 rulemaking (discussed in Section V). These standards are QHOs, ALARA, and AERI.

V. Priority 2: Part 53 rulemaking for licensing new and advanced reactors

NEIMA instructs the NRC to create a technology-inclusive framework for licensing reactors: to meet this mandate, the NRC staff is developing new rule language in 10 CFR Part 53.

Challenge Summary. The NRC staff draft of the proposed Part 53 license framework[13] raises serious questions as to the ability of the NRC to meet the Congressional mandate under NEIMA to develop a modernized, risk-informed, and performance-based license framework for advanced nuclear reactors. Some of the major challenges with the proposed Part 53 draft include the proposed codification of risk standards like QHOs, ALARA, and AERI. BTI and other stakeholders flagged these challenges on multiple occasions through presentations and public comments but the NRC staff largely ignored stakeholder feedback on these critical topics as is evident in the newest draft of the rule, which largely reproduces the existing license framework designed for light water reactors (LWRs) under Parts 50 and 52 with added requirements. In fact, most advanced reactor developers reported that they would not use Part 53 as proposed to license their technology.[14] Further analysis of the draft Part 53 can be found in BTI's whitepaper, Attachment C.

1) As Low As Reasonably Achievable

[12] For example the EPA accepted a standard two orders of magnitude less strict than the NRC's QHOs in the Benzene Standard at 54 FR 38044-45.

[13] The draft Part 53 package was sent to the Commission on Feb 28, 2023 and released to the public on March 6th. It can be accessed here: https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21162A093

[14] The full results of the 2022 study can be found here from slides 52-90: https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22130A523

As Low As Reasonably Achievable (ALARA) is currently an operational practice in the daily activities at nuclear research facilities and power plants, not a design requirement. The Commission has noted, "the ALARA concept is intended to be an operating principle rather than an absolute."[15]

Problem/Challenge. The NRC draft Part 53 language, however, makes ALARA an absolute by codifying it as a requirement that must be met, even in the design of the reactor.[16] It is unclear how the NRC proposes to apply ALARA to its approval of design features. Framework B, the second of the two licensing pathways proposed in the draft Part 53, specifically defines ALARA as[17]:

> *...as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations, and in relation to the use of atomic energy in the public interest.*

This definition can be interpreted in various ways or change over time, creating regulatory uncertainty rather than reliability. The codification of ALARA in Part 53 would impose an extra cost on designs that are separately already required to meet regulatory dose limits and would also impose an endless standard of "as safe as possible" on developers instead of the NRC's legal standard of "reasonable assurance of adequate protection." This would provide no observable benefit to the public in trade for the additional burden.

Proposed Solution. The Commission should direct the staff to maintain the ALARA concept as an operating principle.

2) Alternative Evaluation of Risk Insights

Problem/Challenge. A third example of problematic staff proposals is the Alternative Evaluation of Risk Insights (AERI) methodology, which is intended to be an alternative to completing a Probabilistic Risk Assessment (PRA). Having a simplified yet conservative alternative method of

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[15] Standards for Protection Against Radiation; Final Rule, 56 Fed. Reg. 23359, 23366 (May 21, 1991).

[16] November 21, 2021, Letter from NEI/USNIC to NRC's Executive Director for Operations, Dan Dorman, re: "Comprehensive Industry Comments on the NRC's Rulemaking on, Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors" (RIN-3150-AK31; NRC-2019-0062).

[17] Framework B. §53.4730(a)(11)(i). Framework B is accessible here: https://www.nrc.gov/docs/ML2227/ML22272A040.pdf

risk evaluation would beneficial. However, the assumptions that AERI relies on mathematically and physically impossible conditions, and in several cases, they are not even remotely realistic as reported in BTI's analysis of AERI, (see Attachment B).[18] As currently defined, the AERI approach is unusable and does not represent a feasible alternative method of risk assessment.

Proposed Solution. The Commission should direct staff to revise the approach used in the radiation dose derivation in the AERI regulatory draft guide and base AERI calculations on a plausible assumption of one catastrophic nuclear accident during the licensing period. By revising the frequency of catastrophic events outlined in the regulatory draft guide to accurately reflect both the mathematical basis of the AERI approach and functional possibility, NRC staff can offer an alternative risk assessment approach for reactor designs that meet their qualification requirements.

What is the current status of Part 53 rulemaking? The rule is now with the Commission. Commissioners have made public remarks suggesting that the Part 53 rulemaking is on track and on schedule. This indicates that the commission is likely to move forward with a rule that largely keeps the NRC's current obstructive licensing paradigm. As such, we believe it is likely that modernization will be necessary to drive the thorough cultural and procedural shift at the NRC essential to clearing a path for the timely commercialization of advanced nuclear reactors.

Ongoing BTI-led Effort. To that end, the Breakthrough Institute is hosting two workshops with a variety of stakeholders, including public interest groups, and professional societies, as well as current and prospective reactor applicants to develop an alternative NEIMA-compliant conceptual framework for the commission to consider alongside the proposed Part 53 draft rule. There is stakeholder consensus that the rule should consist of one framework or a single set of rules that is accompanied by guidance that largely provides direction on how to satisfy the rules outlined in the framework. This approach is not reflected in the proposed Part 53 draft rule.

Other Proposed Solutions. Many of the proposed solutions to Part 53 also fall under NRC's risk paradigm in Section IV. Additionally, to help reinforce the intent of the new framework for advanced reactors mandated by NEIMA, Congress should make a few amendments to that legislation. For example, where NEIMA tells the NRC to employ risk-informed and performance-based techniques "where appropriate," NEIMA should instead direct the NRC to use these methods

[18] See the BTI's analysis of the AERI methodology: https://thebreakthrough.imgix.net/AERI-whitepaper-2.pdf

"to the maximum extent possible."[19] This would remind the NRC that this new framework is intended to be different from the prescriptive frameworks they currently use for LWRs. The wide variety of new technologies needs a flexible framework that focuses on the actual performance of the reactors and properly considers risks.

VI. Priority 2: Enabling rapid innovation

Problem/Challenge. To operate a nuclear reactor, applicants require a design approved by the NRC - a tedious and cost-intensive licensing application process. Once approved by the NRC, deviations of any kind from the license approval require additional NRC review to commence or continue plant operation. The nuclear industry is undergoing a renaissance of new and improved modular reactor designs. For example, newer reactor designs are smaller and more compact with the potential to be factory-made on an assembly line. Due to the nature and characteristics of these newer reactor designs, rapid innovation is anticipated. Provisions are currently in place for licensees to pursue changes to existing licenses under 10 CFR 50 and 52. If a licensee needs to make changes to their existing license, a licensing amendment request (LAR) is required. It is the traditional route to regulate changes in plant design and/or operation. Although the LAR process is well defined under Part 50, the regulatory framework is not technology-inclusive and was drafted with large LWRs in mind. By contrast, advanced reactors are expected to utilize a factory production model where several reactors are in process at a time and innovation can be applied as needs arise. Moreover, a LAR does not appropriately provide a streamlined pathway for license amendments since it is not only expensive but can also take up to two years[20] to gain approval from the NRC. In other words, a developer could be required to halt all operations for two years until a license amendment is approved. As a result, the LAR process as written is not aligned with NEIMA and can disincentivize iterative innovation of non-safety-significant components in advanced reactors.

[19] For example, see NEIMA, Public Law 115-439, Sec. 3 (14): "The term 'technology-inclusive regulatory framework' means a regulatory framework developed using methods of evaluation that are flexible and practicable for application to a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods." Emphasis added.

[20] https://www.nrc.gov/about-nrc/generic-schedules.html

Proposed Solution. The NRC is developing 10 CFR Part 53, a regulatory framework that, in theory, will be more appropriate for licensing advanced reactors as opposed to existing regulations under 10 CFR Parts 50/52. Congress should direct the NRC to expect rapid innovation for newer advanced reactors that are widely scalable because of their factory-built characteristics. In order for the agency to prepare for license amendments, the NRC needs to develop a more streamlined amendment process in accordance with NEIMA. The NRC may need further direction from Congress to better prepare for on-the-go innovation after a design is approved.

VII. Priority 2: Modernization of environmental regulation

Modernization is a common theme throughout this comment and it extends to the existing environmental regulatory processes. During this process, consideration must be given to the positive environmental impacts of licensing reliable, carbon-free energy sources that will stand in place of fossil fuel energy sources that are considered reliable but harmful to public health, environment, and the climate. Meeting our decarbonization goals will require scaling up nuclear energy's contribution to the electrical grid. For that to be possible, environmental regulations need to consider the broad and far-reaching consequences of inhibiting or delaying the deployment of clean energy technology. Of the many processes that need to be modernized, there are two specific issues that BTI would like to address.

1) Modernizing the hearing process for contested environmental issues

Problem/Challenge. The NRC's environmental hearing process is a federal agency outlier and a source of added complexity and costs in the licensing process. For major federal actions requiring an EIS, federal agencies typically conduct scoping, provide public notice and comment on the draft EIS, review and respond to comments, and then issue a final EIS.

The NRC conducts this same type of public notice, comment, and response process, but also provides an opportunity to seek a trial-type hearing during which third parties can challenge both safety and NEPA issues before an Atomic Safety and Licensing Board. These hearings are misused by intervenors to delay or derail new nuclear projects. Using the current process, contentions must be raised after the final EIS is issued. Consequently, the issues raised and fully addressed during the public comment process for the draft EIS also may be (and often are) raised again during these proceedings. Substantial applicant and agency resources are required just to address the admissibility of those contentions. The entire process can take many months

(sometimes years) to complete and unnecessarily complicates/extends the NEPA review process, and because these issues were already addressed during the earlier process the additional time does not result in additional benefits. Notably, this is the process that recently resulted in the roll-back of subsequent license renewals for several existing plants.

Proposed Solution. To address this issue, the Commission should direct the NRC to modify its procedures to allow the existing notice and comment provisions for an EIS to simultaneously qualify as an "informal" hearing under the Administrative Procedures Act. This approach is an accepted and well-understood option that aligns with other agencies. It would satisfy any hearing requirement without providing an additional redundant opportunity to essentially "re-adjudicate" NEPA issues in front of an administrative judge that was previously analyzed by the NRC staff in its EIS.

The informal process provides a more accessible pathway for the public to raise legitimate concerns, while limiting opportunities for unproductive intervention to delay. The infomal process would reduce the overall timeline by moving the hearing forward in time to be concurrent with the public comment period. A limited scope rulemaking to revise 10 CFR Parts 2 and 51 would be appropriate to avoid undesired out-of-scope revisions.[21]

In the alternative, the hearing process could be limited as opposed to removed. This could take the form of reducing the amount of time people have to file a complaint or intervention and/or limiting who can file to those who participated in the public comment process.

2) Overuse of Environmental Impact Statements

Problem/Challenge. Environmental Impact Statements (EIS's) are the most involved form of NEPA review, and they are overused by the NRC. This is in part because a less resource-intensive Environmental Assessment (EA) is rarely considered an option. While this may make sense for certain particularly large projects, it should not be standard practice. Unless significant impacts

[21] For more information see: O'Neill, Martin J. (2021). Forging a clear path for advanced reactor licensing in the United States: Approaches to streamlining the NRC environmental review process. Nuclear Law Bulletin No. 105. Volume 2020/2 at p. 43-45. Accessible at: https://www.oecd-nea.org/upload/docs/application/pdf/2021-05/7534_nlb_105.pdf

from the project are strongly expected, NEPA reviews should start with an EA and move to an EIS only if a finding of medium impact or greater is determined.[22]

Another reason that EIS's are overused is that the NRC considers the licensing of a new reactor to be a "major action" that requires a full EIS under 10 CFR § 51.20:

> *The following types of actions require an environmental impact statement or a supplement to an environmental impact statement … Issuance or renewal of a full power or design capacity license to operate a nuclear power reactor, testing facility, or fuel reprocessing plant…*

This decision was made with large LWRs in mind; however, the future of nuclear reactors is more complex. Some reactors will be far smaller, and thus will have less impact on the environment.

Proposed Solution. Congress should consider removing licensing of new reactors from the list of actions requiring an EIS, and allow the level of environmental evaluation to be determined on a case-by-case basis.

VIII. Priority 2: Modernizing NRC fee structure

Problem/Challenge. To date, approximately 90% of the NRC budget comes from fees paid by licensees and applicants. These fees are based, in part, on NRC staff hours spent reviewing and dispositioning licensing and permitting applications.[23] Licensees are unable to dispute the hourly rates or estimation of staff hours necessary to review an application, and there is no recourse if a review exceeds that estimate. Reviews can take upwards of 18,000 hours even for small reactors. Although nuclear reactors used to be built by established conglomerates that could afford those costs, many of today's developers of advanced reactors are start-ups that are less equipped to bear the extra expenses.

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[22] Reducing the use of unnecessary EIS's saves both time and money for all parties. For example, NASA's Radioisotope Power Systems (RPS) Program specified that the NEPA process for its missions would start with an EA, when it previously automatically began with an EIS, and they implemented a programmatic NEPA approach. These two changes could result in "NEPA process costs of $50K as opposed to $2M." For more information see: Eppig, Bethany et al. "NASA's Approach to Nuclear National Environmental Policy Act Compliance." Nuclear and Emerging Technologies for Space Lightening Talks, 2021. https://nets2021.ornl.gov/wp-content/uploads/2021/08/Lightening-Talks.pdf

[23] Currently, fees are calculated using a professional staff-hour rate of $290 per hour. 10 CFR § 170.20, https://www.nrc.gov/reading-rm/doc-collections/cfr/part170/part170-0020.html

Proposed Solutions. Congress should direct the NRC to adopt a fee structure that will better enable innovation. The recently introduced ADVANCE Act[24] takes a pass at reforming the NRC's fee structure. With some amendments, it could solve much of the problem. Revisions to the fee structure that reduce the percentage of fees the agency must recover from applicants would help reduce the burden on both applicants and staff, and balance this relationship. We recommend deferring NRC fees until after the applicant has a license, and thus has the ability to generate revenue from sales. In the meantime, the NRC could recover its real-time costs via a small rolling fund initially seeded by the government. Without a program in place, only large corporations or utilities will have the resources to pursue a license at multiple sites concurrently, creating a barrier to rapid deployment.

Another recommendation is to add a cost cap on the review of an accepted application; costs above that would be paid by Congressional appropriations. The cap would be determined based on recent NRC review schedules. The NRC should then set up its work plan to hold expenses down to that level. This approach will strongly incentivize the NRC to issue a license decision in a more timely manner, while avoiding objections that the NRC does not have sufficient flexibility to protect the public. Several agencies already use a flat fee system. Incorporation of these changes will likely require an increase in the NRC's overall resources and staff capacity.

IX. Priority 2: NRC staffing

Problem/Challenge. The NRC has been facing staff attrition for nearly a decade. Unless changes are made, the problem is only likely to worsen since there are significant senior staff retirements on the horizon in the next several years, and the NRC continues to fail in achieving hiring goals.

Due to the attrition of experienced staff, the same staff is often associated with multiple applications and must switch back and forth between reviews. Additionally, the rising turnover rates mean that applicants often have new staff join an application review mid-process. The NRC has tried to address this by implementing a "core team" approach, which means many staff members do not work on a variety of applications, a "core team" is assigned to work on a specific project - an idea designed to reduce staff changes mid application. However, it can lead to knowledge concentration, limiting the number of people with the experience to work on similar

[24] https://www.epw.senate.gov/public/index.cfm/2023/4/capito-carper-whitehouse-introduce-bipartisan-nuclear-energy-bill-the-advance-act

projects in the future. This approach can also cause resentment amongst staff members who are not given the opportunity to join the team. Another noteworthy concern is that the agency's success can be influenced by the experience of the project manager assigned to an application.

These are major challenges the NRC must overcome to ensure it maintains the adequate level of staff needed to process future applications, but also to ensure that it can replenish the experienced career employees and retain the institutional knowledge those individuals possess. The NRC has sufficient staff at the moment[25]; however, they will need to staff up in the near future as the number of advanced reactor applications grows.

Proposed Solution. In anticipation of a wave of new advanced reactor applications, the NRC will need to aggressively increase its staff capacity, especially given the agency's current attrition rate.

X. Priority 2: Modernizing the ACRS' role

Problem/Challenge. The Advisory Committee on Reactor Safeguards (ACRS) can unnecessarily belabor the license review process, presenting as a bottleneck during the NRC's review of multiple reactor designs. The ACRS is an independent committee formed to review safety studies and facility license applications on a request basis from the Commission.[26] However, their role is on an evolutionary track which could result in performing reviews for all license applications in the queue, which could present unnecessary delays. Moreover, their review schedule is typically full despite having only one application in process at a time. With a large number of reactor applications on the horizon, the ACRS will become a bottleneck in the licensing process.

Proposed Solution. We recommend that Congress request a report from the Commission on the function of the ACRS including its potential limitations, opportunities for increased efficiency, and recommendations for correcting those limitations while improving licensing efficiency. In addition, the ACRS' statutory mandate in the Atomic Energy Act should be amended to remove the requirement that the ACRS review all construction permit and operating license applications and instead emphasize that the ACRS should focus on novel and safety-significant issues.

[25] This is evidenced by the NRC's completion of the Kairos draft Environmental Impact Statement nearly two months ahead of schedule, subsequent license renewals consistently being completed in 18 months, and the timelines for the TRISO-X and ACU MSRR applications matching generic NRC schedules.

[26] See the ACRS Charter: https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20337A117

XI. Priority 3: Extension of the Price-Anderson Act

Problem/Challenge. Price-Anderson requires industry to maintain substantial insurance to cover the costs of an accident with offsite consequences, and provides a backstop where the government would provide coverage in excess of the insurance. Though a step in the right direction, the recently introduced ADVANCE Act bill would only grant a 20-year extension, half-way through the reactor licensing period under the provisions of the Price-Anderson Act. An extension of the Price-Anderson Act would provide assurance to potential investors and developers that reauthorization will not be a future barrier to starting a new project.

Proposed Solution. To minimize market uncertainty, Congress should extend the Price-Anderson Act for 40 years, the typical reactor licensing period.

XII. Priority 3: Fuel availability, spent fuel reprocessing and/or disposal

1) High Assay Low Enriched Uranium

Problem/Challenge. Domestic high assay low-enriched uranium (HALEU) fuel supply and security is threatened by dependence on foreign resources. The Russian invasion of Ukraine has made clear the dangers of relying on Russian fuels. Access to reliable domestic HALEU is critical to the deployment of new and advanced reactors in the U.S. and cannot be overstated. Increasing the availability of domestic HALEU will strengthen the U.S. national security.

Proposed Solution. Congress should support funding to secure domestic availability of fuel separate from Russian supply. This will require rapid scale up of production capabilities in the U.S. and or with allies.

2) Spent Nuclear Fuel

Problem/Challenge. As one of the countries with the largest plutonium (Pu) inventory, the U.S. is extremely cautious and cognizant of the associated proliferation concerns regarding reprocessing spent nuclear fuel. While the U.S. maintains reservations about spent fuel reprocessing, many European countries, Russia, China, and Japan have been leading the effort on used fuel reprocessing through policy. Like the U.S., these countries are aware of the proliferation concerns and yet they've managed to reprocess spent nuclear fuel, in the case of France, they've

been reprocessing safely for decades. The policies in place for these reprocessing countries are driven by reducing the long-term radioactivity of high-level waste and minimizing the probability of Pu diversion from civilian use. One of the main challenges that needs to be addressed is the perception of spent fuel as waste instead of a reusable resource. The alternative is to bury spent fuel underground at a long-term geologic repository. The U.S. government chose Yucca Mountain as a long-term geological repository but due to opposition from the state of Nevada, this effort has been stalled. The U.S. government will need to do some work to regain public trust by being more transparent with communities near long-term geological repository candidates as the nation makes progress on spent fuel management and disposal.[27]

Proposed Solution. A good balance of the two solutions will require legislative changes to explore reprocessing of civilian spent fuel, as well as re-open the possibility of one or more domestic repository sites. Programs like Advanced Research Projects Agency-Energy (ARPA-E), Converting UNF Radioisotopes Into Energy (CURIE) and Optimizing Nuclear Waste and ADvanced Reactor Disposal Systems (ONWARD) programs move in the right direction but are still in the very early stages of R&D. A more comprehensive and scalable program is necessary.

XIII. Conclusion

Positioning the U.S. to become a global leader in advanced reactor deployment will require addressing several regulatory challenges currently facing the civil nuclear industry. BTI believes that these challenges can be addressed through modernization of the existing nuclear regulatory infrastructure. This comment identifies several critical regulatory challenges that are inhibitors of modernization, bins them in order of priority and proposes solutions to address those challenges. Many of the solutions involve intervention from Congress and or the Commission.

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1) [27] ANS report on Special Committee on Generic Standards for Disposal of High-Level Radioactive Waste: https://www.ans.org/policy/repositorystandard/

Before the United States House of Representatives
Committee on Energy and Commerce
Subcommittee on Energy, Climate, and Grid Security

Regulation of Nuclear Energy
Request for Information

Clean Air Task Force

May 5, 2023

Re: Clean Air Task Force Response to House Committee on Energy and Commerce Subcommittee on Energy, Climate, and Grid Security Request for Information on Improving the Licensing Review and Approval Process, Oversight of Nuclear Regulatory Commission Licensees, Nuclear Regulatory Commission Activities, and Other Pertinent Information

Clean Air Task Force ("CATF") is pleased to respond to the House Committee on Energy and Commerce Subcommittee ("Subcommittee") on Energy, Climate, and Grid Security Request for Information relating to the Nuclear Regulatory Commission ("NRC" or "Commission"). CATF is a global nonprofit organization working to safeguard against the worst impacts of climate change by catalyzing the rapid development and deployment of low-carbon energy and other climate-protecting technologies. With over 25 years of internationally recognized expertise on climate policy, science, and law, and a commitment to exploring all potential solutions, CATF is a pragmatic, non-ideological advocacy group focused on climate change and the clean energy transition. CATF has offices in Boston, Washington, D.C., and Brussels, with staff working remotely around the world.

To reiterate a point from Armond Cohen's April 18, 2023 testimony, "the U.S. NRC will need to be ready to license large numbers of new advanced reactors by 2030 if nuclear energy is going to play a significant role in reaching U.S. energy and climate goals."[1] It will need to do so while keeping to its core mission to provide for public health and safety, and, at the same time, conforming to the Atomic Energy Act's purpose of enabling the "development and utilization of atomic energy for peaceful purposes."[2]

Clean Air Task Force ("CATF") here provides recommendations to meet that challenge, consistent with the NRC values of independence, openness, efficiency, clarity, and reliability as laid out in its "Principles of Good Regulation."[3] These recommendations are based on CATF's singular experience and understanding of NRC activities and should not be taken as an exhaustive list of policies that could help the NRC improve to meet the demands of U.S. energy and climate goals.

Recommendations to improve the licensing review and approval process, as well as the oversight of NRC licensees.

- NRC Hearings: The NRC hearing process can be overly complicated, time-consuming, repetitive, and, in the case of National Environmental Policy Act ("NEPA") reviews, out of line with normal federal practice. At a minimum, the following should be done:

[1] *American Nuclear Energy Expansion: Powering a Clean and Secure Future: Hearing Before the H. Subcomm. on Energy, Climate, and Grid Security*, 118th Cong. 61 (2023) (written testimony of Armond Cohen, Executive Director, Clean Air Task Force) [hereinafter Cohen, *Testimony*].
[2] 42 U.S.C. § 2013(d).
[3] Nuclear Regulatory Commission ("NRC"), *NRC: An Independent Regulatory Agency*, at 2, https://www.nrc.gov/docs/ML2028/ML20282A656.pdf (last visited Apr. 16, 2023); *see also* NRC, *Principles of Good Regulation*, https://www.nrc.gov/docs/ML1413/ML14135A076.pdf (last visited Apr. 16, 2023) (expounding on the agency's regulatory principles).

- Simplify contested hearings, reduce unnecessary administrative burdens like discovery, and eliminate hearings on topics with no impact on the adequate protection of public health and safety.
- Revise the Atomic Energy Act ("AEA") Section 189a.(1)(A) to clarify that NEPA issues should not be part of the scope of hearings granted on request of any interested person.

- Advisory Committee on Reactor Safeguards ("ACRS"): As the Nuclear Innovation Alliance ("NIA") noted in a March 2023 report, "changes in the NRC and its scope of work over the decades along with a static statutory mandate has [sic] increased ACRS engagement in matters where the ACRS provides less overall value... It is timely to consider a different role for the ACRS as it no longer serves the same role as its predecessor did in the 1950s-60s during the dawn of the nuclear age."[4]
  - Revise the Atomic Energy Act to narrow ACRS reviews to only those that present new and significant safety issues as designated by the Commission.

- Public and Applicant Engagement: The NRC has a self-imposed practice of limiting substantive conversations between NRC staff and license applicants to public fora. This practice is done in the name of transparency but creates unnecessary burdens and significant delays. At the same time, the NRC's website, document management system, and public engagement processes need to be updated.
  - Clarify to the Commission that the NRC staff can and should engage in non-public meetings to resolve issues directly and quickly, while still maintaining transparent information exchanges with the public by maintaining licensing submittals and written communications in ADAMS.
  - Direct the Commission to update its website, modernize the Agencywide Documents Access and Management System ("ADAMS"), and improve the public meeting process by encouraging NRC engagement and two-way communication.

Recommendations on the NRC's implementation of the Nuclear Energy Innovation and Modernization Act ("NEIMA") mandate to develop a "technology-inclusive, risk-informed, performance-based regulatory framework" ("TI-RIPB") for advanced reactors.

- The most urgent issue facing the NRC today is the creation of a new licensing and regulatory framework for advanced reactors. Unfortunately, the draft proposed advanced reactor regulatory framework (10 C.F.R. Part 53), submitted by the NRC staff to the Commission on March 1, 2023, does not carry out NEIMA's mandate of a truly TI-RIPB rule. Instead, the proposed Part 53 framework further builds on the prescriptive requirements and framework designed for conventional reactors, creating a rule that would make licensing advanced reactors under Part 53 even more challenging than it would be under Parts 50 and 52. Although the public (including industry and NGOs)

[4] Danielle Emche et al., Nuclear Innovation Alliance, *Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards* 11 (2023), https://www.nuclearinnovationalliance.org/index.php/improving-effectiveness-and-efficiency-advisory-committee-reactor-safeguards.

have submitted extensive and detailed comments addressing the flaws in the proposed rule and have proposed tangible solutions, these comments have not been addressed.[5]

- Direct the Commission to direct the NRC staff to pull the proposed Part 53 rule package back and modify it to incorporate public comments with the goal of truly addressing NEIMA's mandate before releasing it for public comment.

Information and recommendations about improving NRC efficiency, management of regulatory costs and fees, public health and safety, staff effectiveness and culture, collaboration with the Department of Energy, and International Activities.

- NRC Fees, Funding, and Compensation: The NRC's fee, funding, and compensation structure can be reformed in several ways to enable many of the reforms above and reduce the undue and often restrictive burden on applicants, while also allowing it to hire and retain the best talent. The following recommendations are adapted from the ACRS report noted above and the NIA summary Draft Report Armond Cohen referred to in his April 18 testimony.[6]
  - Revise the Atomic Energy Act to provide that all costs associated with ACRS reviews, including the cost of ACRS time, be excluded from the fee recovery requirement.
  - Revise the Atomic Energy Act to provide that all NRC staff time used to prepare for ACRS meetings should not be billed to licensees and should also be excluded from fee recovery.
  - Increase or modify the corporate support cap for NRC to provide adequate resources for management.
  - Increase or modify NRC off-fee funding to enable greater project management training for NRC staff and management.
  - Increase or modify the corporate support caps for NRC to enable more effective hiring, retention, and staffing.
  - Provide NRC with more flexible hiring and compensation authority for technical positions within agency (like the Securities and Exchange Commission does).
  - Provide off-fee funding to expand and accelerate future-focused research at the NRC in order to support the development of regulatory processes that can enable industry to utilize new or novel technologies while still allowing the NRC to meet its public health and safety mission.
  - Increase off-fee funding for NRC development of new digital information tools and frameworks (e.g., update its website, improve ADAMS, improve the public meeting process).
  - Increase off-fee funding for dedicated staff to bolster transparency and public confidence in NRC programs by conducting proactive, two-way engagement with the public and developing simplified and accessible technical documents

[5] *See, e.g.*, Cohen, *Testimony*, *supra* note 1, at 64-65, and sources cited therein.
[6] *See generally id.*; Patrick White & Judi Greenwald, NIA, *2023 NRC Reform Recommendations: Discussion Draft* (2023), https://www.nuclearinnovationalliance.org/index.php/nia-discussion-draft-nrc-reform-recommendations; and Cohen, *Testimony*, *supra* note 1.

- Regulatory Innovation and Efficiency: The NRC will need to increase the effectiveness of its technical and project management as well as adopt more innovative practices if it is to license advanced reactors at the needed scale. To this effect, the following recommendations are adapted from the NIA summary Draft Report Armond Cohen referred to in his April 18 testimony.[7]
    - Establish a Blue Ribbon Committee to conduct a one-year review and audit of NRC effectiveness - heavily weighted with former NRC staff, management, and senior leadership.
    - Provide direction and funding to NRC Commission to develop an Office of Regulatory Innovation.
    - Direct the GAO or NRC to assess and draw lessons from regulatory innovation in other sectors (e.g., aviation regulation) and report on process improvements or changes.

- Nuclear Liability: The Price-Anderson Act ("PAA"), which was enacted in 1957 as an amendment to the AEA, has established a system of financial protection that has allowed the participation of private companies in the nuclear industry in the United States for the past 65 years and has provided protections to members of the public in the unlikely case of a nuclear incident. Further, the PAA is necessary for the United States to comply with its obligations under the Convention on Supplementary Compensation for Nuclear Damage ("CSC"). The CSC provides nuclear liability protections to U.S. nuclear exporters for projects overseas, and as such, is highly important in allowing the United States to participate and thrive in the quickly growing nuclear market, facilitating decarbonization and national security initiatives.
    - Extend the PAA for at least 40 years past its expiration in 2025.

- Foreign Investment: The AEA prohibits the NRC's issuance of a license to own or operate a power or research reactor to any company owned, controlled, or dominated by a foreign entity. Under the NRC's current interpretation of the AEA's requirements, all owners of a nuclear power plant—including even those with a small minority interest—are required to obtain an NRC license to hold such interest and may not do so without the NRC's finding of an absence or sufficient negation of foreign ownership, control or domination ("FOCD"). This provision and the NRC's interpretation of it have hindered nuclear projects with U.S. allies in the past. Further, this provision is duplicative because the AEA already contains a requirement that the NRC refrain from issuing licenses that "would be inimical to the common defense and security or to the health and safety of the public." Accordingly, even without the FOCD prohibition, the NRC already reviews potential investment by foreign interests into companies that operate power and research reactors from a national security and public interest standpoint.
    - Eliminate altogether the AEA's FOCD restrictions with regard to power and research reactors.
    - Alternatively, the ADVANCE Act's "Investment by Allies" section would change the AEA requirements to allow foreign ownership of reactors by companies in nations that do not pose security risks. However, the list of permitted countries in

[7] White & Greenwald, *supra* note 6.

the ADVANCE Act is too exclusive and leaves out several U.S. allies and key players in the nuclear industry. Our recommendation is to waive the FOCD restrictions for companies not located in nations whose policies are deemed inimical to the common defense and security or to the health and safety of the public (e.g., "Restricted Countries"). A list of Restricted Countries could be maintained and updated from time to time by the NRC.

Other issues that may be pertinent to regulation or deployment of nuclear reactor technologies

- NRC Mission: The NRC's public health and safety mission is paramount, but it leaves out other important elements from the Atomic Energy Act's original mandate, elements that would put the NRC in a better position to facilitate the U.S. achieving its clean energy and climate goals. This creates a condition where NRC operates under a different approach from other regulatory agencies like the Federal Aviation Administration.
    - Clarify the NRC's mission to incorporate timeliness and efficiency.

We appreciate the opportunity to submit this information and look forward to discussing with Committee Members and professional staff.

Respectfully submitted,

Clean Air Task Force

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CLEARPATH ACTION

May 5th, 2023

Chair Cathy McMorris Rodgers
Energy and Commerce Committee
The House of Representatives
Washington, DC 20515

Ranking Member Frank Pallone
Energy and Commerce Committee
The House of Representatives
Washington, DC 20515

Subcommittee Chair Jeff Duncan
Energy, Climate, and Grid Security Subcommittee
Energy and Commerce Committee
The House of Representatives
Washington, DC 20515

Subcommittee Ranking Member Diana DeGette
Energy, Climate, and Grid Security Subcommittee
Energy and Commerce Committee
The House of Representatives
Washington, DC 20515

Dear Chair McMorris Rodgers, Ranking Member Pallone, Chair Duncan, and Ranking Member DeGette:

Thank you for the opportunity to respond to the House Energy and Commerce Subcommittee on Energy, Climate, and Grid Security's request for information (RFI) that will inform new legislation and oversight activities to modernize the Nuclear Regulatory Commission (NRC). ClearPath Action, a 501(c)(4) organization, advocates for clean energy innovation, modernized permitting and regulatory reform, American manufacturing competitiveness, and unlocking America's natural resources.

ClearPath Action would like to thank the Committee for its leadership on U.S. nuclear energy, including the Nuclear Energy Innovation and Modernization Act (NEIMA) of 2019, which helped bring attention to the vital role of the regulator in enabling innovation. This RFI is an important next step in gathering information and developing comprehensive NRC-modernization legislation that provides the NRC with the incentive, ability, and direction to handle the increased variety and volume of new reactor applications.

Significant bipartisan support for nuclear energy, including the support from this Committee, has cleared the path for multiple first-of-a-kind demonstrations in the near future and primed the industry for widespread deployment shortly thereafter. In fact, the NRC has publicly stated it anticipates at least 13 applications for advanced reactors by 2027.[1] This domestic momentum is gaining international attention. At least eight U.S.-based companies have publicly-announced international partnerships to explore deployment in more than 10 countries, and more are in conversation.

The expeditious deployment of nuclear energy domestically will have many benefits. Nuclear energy contributes to our nation's energy and national security; provides a strong tax base and high-paying, sustained jobs for local communities; and accelerates the world toward meeting

[1] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML22038A001

clean energy and climate targets. Nuclear energy is also a reliable source of 24/7 clean electricity. To date, billions of public and private dollars have been invested in enabling the development of new nuclear reactors, and deploying these reactors should have an efficient, effective, and predictable licensing process.

Additionally, the U.S. should be a reliable ally in international nuclear deployment to the dozens of countries interested in building new nuclear facilities. Russia currently supplies the majority of the nuclear export market, and one-third of all reactors under construction in the world today are in China. The U.S., in partnership with our allies, must provide an alternative to Russia and China for countries that want to utilize nuclear energy.

One mechanism to enhance nuclear deployment domestically and spur innovation is to modernize the NRC, and Congressional direction is needed. Over time, the culture of the NRC has trended toward indecision and excessive caution. The resulting regulatory uncertainty has limited investment, stifled innovation, and delayed the deployment of safe, emissions-free nuclear technologies. For example, the NRC's lack of experience with new technologies has led to the applicants educating NRC staff on technologies at the applicant's expense. High NRC staff attrition and turnover exacerbates this preventable waste of small-business resources.

A successful regulator would change the deployment landscape. It would be trusted by the public, inspire confidence in the licensing process, and lend credibility to the projects it licenses. Predictably and efficiently issuing licenses that uphold the NRC's important safety and security mission would enable nuclear innovation. Improved NRC credibility and accelerated technology deployments would unlock new markets and improve the common defense and security by creating a U.S. alternative to Russian and Chinese energy dominance. In addition, each reactor deployment provides incredible benefits for a global clean energy future. Finally, a successful regulator would foster internal NRC staff trust in leadership and constantly improve organizational culture to reverse the downward trend in workplace satisfaction and foster a culture of proactiveness and innovation.

Today, the nuclear industry is headed towards an optimistic future, but all new reactor designs, and their chance for deployment face hurdles at the NRC. These next few years are crucial to enabling wide-scale deployment. The NRC will need to balance necessary modernization activities with reviewing the initial wave of license applications. Congress must provide the NRC with the proper incentives, abilities, and direction to review the variety and volume of nuclear technologies under development. To be successful, Congress must take a holistic approach to legislative action.

Below are ClearPath Action's recommendations to comprehensively address the human capital, process, procedure, and legislative challenges at the U.S. Nuclear Regulatory Commission. The U.S. nuclear industry is growing to address increased domestic demand and the global market. There must be broad, comprehensive changes at the NRC to transition it to an agency that can efficiently license and oversee hundreds of new reactors. A successful NRC will be vital for energy security, national security, clean energy deployment, and public safety.

Again, thank you to the Committee for the opportunity to provide our feedback on this matter. We look forward to working with the Committee on this important topic.

Sincerely,

Rich Powell
Chief Executive Officer
ClearPath Action

Nuclear Regulatory Commission Purpose, Employee Retention, and Continuous Improvement

Update the Nuclear Regulatory Commission's purpose to enable the safe, secure, and environmentally responsible use and control of atomic energy.

The NRC's culture has trended toward indecision and excessive caution. There are numerous examples of public meetings, especially on Part 53, where the NRC staff do not directly answer questions from industry or public stakeholders. It is common for staff to say their inaction is caused by the belief that being proactive is equivalent to promoting the industry or nuclear technology. The staff also see adapting to industry trends as promotional and not focused on public health and safety. However, as overseers of the regulatory framework for the civilian nuclear energy industry, the Commissioners and NRC staff should be able to confidently respond to questions on applicable regulatory requirements for a company or explain regulatory safety decisions to the public.

This philosophical and cultural challenge does not allow the NRC to prepare to license a budding domestic industry expeditiously. It also prevents the NRC from further engaging with new nuclear countries to ensure they can safely regulate nuclear energy within their borders.

> **Recommendation:** Amend the Atomic Energy Act of 1954 to statutorily require that the NRC's purpose includes "enabling the safe, secure, and environmentally responsible use and control of atomic energy." This change provides direction to the NRC to serve the public interest as well as its important safety and security mission.
> **Recommendation:** Update the Atomic Energy Act of 1954 section that establishes the NRC's Office of Nuclear Reactor Regulation (NRR) to clarify that part of the Office's responsibilities are to enable the deployment of nuclear technologies and be efficient, effective, predictable and anticipatory of industry trends.

Require an external, continuous modernization audit of the NRC.

Comprehensive modernization of the NRC will be an iterative process over several years as it continues to build staff capacity and capabilities. An external, continuous audit of the NRC would draw from NRC lessons learned; the lessons of other nuclear and non-nuclear industries; foreign regulators such as the Canadian Nuclear Safety Commission; and domestic regulators such as the Federal Aviation Administration, Food and Drug Administration, and Federal Energy Regulatory Commission. It would also be able to impartially gather feedback from NRC licensees, applicants, and external stakeholders to recommend process improvements to facilitate efficient licensing.

> **Recommendation:** Authorize an external management and accounting audit to provide ongoing recommendations for how the NRC can better its project management practices. This audit should include recommendations that can be implemented at the staff level, management level, and Commission level. It should also identify areas that require Congressional action. This audit should be conducted every five years to ensure the NRC continuously seeks to improve and innovate its processes.

Reform compensation structure to attract and retain industry leaders.

In June 2022, the NRC staff stated to the Commissioners that 42 percent of staff are eligible to retire within the next five years.[2,3] Furthermore, 22% of the workforce is under the age of 40, and 57% of the workforce is over the age of 50.[4] Concurrently, the nuclear industry is rapidly expanding with dozens of innovative companies looking to hire highly technical engineers and scientists. This competition for talent puts additional strain on the NRC, which has also decreased in total employees by nearly 25% since 2016, to ensure that it has the correct staff and expertise to license and oversee the industry. A technically-compromised NRC will negatively impact the industry. Even if processes and procedures are properly aligned to accelerate licensing, a lack of technical expertise will slow the licensing process.

The GS payscale can also make hiring expert mid-career professionals challenging for the NRC. For example, due to the locality pay in the Washington DC region, top technical staff do not receive a promotion or step change (salary increase) once they reach GS-15 step 7. Additionally, the NRC's Senior Level Service pay group, which are non-managerial technical experts, is only about 1% of the NRC's staff.[5] Not offering growth and development potential for high-performing staff limits the recruitment and retention of staff who are objectively world leaders in their fields. To address similar challenges, several financial regulatory agencies[6] pay their employees different salaries than the GS scale and offer meaningful differences in benefits to attract staff competitively with the private sector. The NRC must be able to attract ambitious and capable staff at all career stages to create a robust regulatory body for the nuclear industry.

> **Recommendation:** Require the Government Accountability Office, in conjunction with the Nuclear Regulatory Commission and the Office of Management and Budget, to develop a report comparing the NRC's pay structure to other federal agencies and recommend changes to attract and retain high-performing staff. To permit the NRC to incorporate changes, the Atomic Energy Act requires an amendment.

Regulatory Changes for Modernized Licensing Reviews

Improve the licensing process for subsequent reactor builds.

After a reactor has been deployed, its construction and operating experience can provide confidence in licensing subsequent builds of that design. Changes to NRC regulations, processes, and procedures can allow the staff to thoughtfully incorporate this construction and operating experience to facilitate the rapid deployment of new technologies.

Overall, ClearPath Action broadly urges the Committee to consider policies that can enable subsequent builds. This response contains specific recommendations to retool both licensing

[2] https://www.nrc.gov/docs/ML2217/ML22175A025.pdf
[3] https://www.nrc.gov/docs/ML2216/ML22161A036.pdf
[4] https://www.nrc.gov/about-nrc/employment/workingatnrc.html
[5] https://www.federalpay.org/employees/nuclear-regulatory-commission
[6] For example, the agencies listed in 12 U.S.C. 1833b, as amended; the Securities and Exchange Commission; the Board of Governors of the Federal Reserve Board; and the Office of the Comptroller of the Currency.

and environmental review processes that accelerate the deployment of new technologies while maintaining the NRC's important safety and security mission and protecting the environment.

Recommendation: Require several targeted rulemakings to expedite the NRC licensing process for subsequent deployments of proven designs. For example:

1. Create a pathway for operating reactors licensed by the NRC to qualify for a Design Certification more easily. Design Certifications are a way to reduce licensing timelines by gaining NRC approval for an essentially complete design.
2. Create an optional, expedited licensing procedure for reactors that have been licensed and built so that a final licensing decision can be made in less than 18 months.
3. Implement targeted changes that would improve licensing efficiency:
    a) Extend the duration for which a manufacturing license is valid.
    b) Clarify the amount of commercial power activity permitted at research and test reactors. This would benefit the deployment of new and upgraded research and test reactors.

Improve the internal adjudicatory process.

According to a recent report by Idaho National Laboratory,[7] NRC hearings have a significant impact on licensing processes. They can potentially increase timelines for every licensing action by 4-7 months without providing any additional safety benefits. These delays significantly impact financing timelines and increase the cost of projects. The report offers several recommendations to improve the hearing process, decrease timelines, and maintain stakeholder engagement. The NRC should modify its regulations and procedures to minimize hearings with no benefit to public safety or the environment. This would accelerate the licensing timeline, improve the use of staff and applicant resources, and allow the staff to focus on important topics related to their safety and security mission.

Recommendation: Require that the NRC use informal adjudication to the maximum extent possible in the circumstances when –

a) a license renewal is similar to a previously approved license renewal of a similar reactor design;
b) a license application for which a reactor of a similar design has already been licensed;
c) a license is transferred for a licensee; and
d) a license is amended.

Recommendation: Require the Comptroller General to conduct a study on further improving NRC adjudicatory procedures' efficiency, effectiveness, and predictability.

Recommendation: In accordance with the INL report, require the NRC to remove the contested hearing opportunity on environmental topics to align with the traditional public comment and challenge process under NEPA, as well as amend the Atomic Energy Act

[7] Idaho National Laboratory, "Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process," INL/RPT-23-72206 Revision 0, dated April 2023

of 1954 to remove the requirement for the NRC to hold an uncontested "mandatory hearing."

Improve information systems and resources for stakeholder engagement.

The NRC is difficult to engage with due to outdated document management and conferencing systems, convoluted record-keeping procedures, aging online infrastructure, and the broad stakeholder groups that the NRC engages with. Due to the highly technical nature of the NRC's work, the NRC needs to communicate effectively with stakeholders; however, the document search system is opaque, and the method for finding meeting information is not intuitive. It is a difficult task to be accessible, and the NRC must make an effort to foster the public's trust, build confidence in the licensing process, and provide credibility to the projects it licenses.

> **Recommendation:** Direct the NRC to add public engagement into its guiding laws. This can be accomplished by adding a definition for "public engagement" to the Nuclear Energy Innovation and Modernization Act fee-relief activities and by adding a public information and engagement mandate to the Energy Reorganization Act of 1974 regarding NRC activities.

Enable the Use of Modern Technologies to Remediate Legacy Uranium Mine Sites.

Legacy uranium mining activities continue to be a burden on communities and a significant barrier to the deployment of new nuclear technologies. New remediation technologies hold promise to clean up these sites quickly and cheaply; however, the Atomic Energy Act of 1954 did not envision these new technologies and currently requires a specific type of license that is not appropriate. This creates a significant barrier to their deployment. Recently, the Commissioners issued a letter[8] stating that they directed the NRC staff to provide different options for the licensing of emerging technologies used for remediating mine waste. To accelerate and codify that change, Congress can take action to enable these new remediation technologies.

> **Recommendation:** Amend the Atomic Energy Act of 1954 to enable the use of modern technologies to help remediate uranium mine sites. The current regulatory framework must be updated to recognize the environmental benefits that can be provided by novel technologies and approaches to remediation at uranium mining sites that are contaminated by uranium and other constituents of concern.

Create a design-specific general license.

New nuclear technologies can be built more quickly than large light water reactors. In many cases, they can be built in a factory and shipped to be constructed at sites around the country and the world. This business model has been successful for other industries, such as aerospace and combined cycle natural gas, but the nuclear regulatory framework currently impairs the pace and scale envisioned.[9] Enabling a general license for new nuclear technologies would fundamentally change the deployment rate of clean, reliable nuclear technologies.

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[8] https://www.nrc.gov/docs/ML2308/ML23089A233.pdf
[9] The NRC can currently issue general licenses for other technologies that it regulates.

Recommendation: Amend the Atomic Energy Act of 1954 to require the NRC to establish a design-specific general license for a production or utilization facility, including non-power facilities, similar to a design the NRC has already licensed. In addition, the NRC should include, as part of the design-specific general license review, a generic environmental review that meets the National Environmental Policy Act requirements. Any generic environmental review shall be updated every 10 years to maintain relevance. The designs would still be subject to Commission rules and regulations related to their safe operation, maintenance, and decommissioning. Any changes to the design, as defined by an appropriate change control process, would still be subject to further review by the NRC.

Clarify the definition and regulation of fusion energy.

Recently the Commissioners unanimously voted to regulate fusion energy under a byproduct material framework.[10] This was a positive development and will continue through the NRC's processes. However, this would not fix any underlying statutory confusion about the relationship between fusion and fission energy production facilities.

Recommendation: Update the Nuclear Energy Innovation and Modernization Act to remove "fusion" from the December 31, 2027 timeline to complete the technology-inclusive regulatory framework rulemaking.
Recommendation: Amend the Atomic Energy Act to clarify that a fusion facility should be regulated as a byproduct material facility, not a utilization facility. This change would remove ambiguity relating to the Commissioner's vote pathway for fusion energy systems.

Extend the Price-Anderson Act.

The United States is one of the few countries with an accident liability and compensation framework in place. Nuclear energy has unique liability needs, and the U.S. must retain this framework to ensure liability is assigned and the public is protected in the case of a major accident. Reactors are initially licensed for a period of 40 years, so any built now through 2050 would be subject to Price-Anderson if it were extended by a least 75 years.

Recommendation: Extend the sunset date of the Price-Anderson Act for at least 75 years.
Recommendation: Require the Government Accountability Office to review and recommend changes to Price-Anderson every 15 years due to the advances in the nuclear industry.

[10] SECY-23-0001

Regulatory Changes for Modernized Environmental Reviews

Prepare for new instances of National Environmental Policy Act implementation.

In addition to a technical review, the NRC performs an environmental review in accordance with the National Environmental Policy Act (NEPA). The current environmental review framework requires an environmental impact statement (EIS) regardless of the project; however, decades of operation have shown that nuclear energy has minimal environmental impacts. Advanced reactors, which have smaller footprints and passive safety features, would further reduce the potential environmental impact. Changing requirements like this can provide flexibility to regulate in a performance-based and risk-informed manner, remove redundancy, and support the safe, environmentally protective deployment of new nuclear technologies.

> **Recommendation:** Require the NRC to promulgate a comprehensive rule to update how it complies with the NEPA to alleviate the administrative burden on the NRC staff, licensees, and applicants while continuing to ensure a robust, risk-informed, and environmentally protective process.
>
> a) Establish or revise a Generic Environmental Impact Statement for facilities in energy communities to make it easier to site and permit nuclear reactors on brownfields and former fossil fuel sites.
> b) Modify which actions require an EIS, and could utilize an Environmental Assessment of Categorical Exclusion.
> c) Remove hearings on uncontested issues.
> d) Remove the six-month maximum separation between filing the two parts of a license application.
> e) Create a modified early site permitting process for sites in energy communities.

Expand access for Energy Communities to early site permits.

Advanced reactors can be worthwhile for communities with retiring or retired thermal generating facilities. Because advanced reactors are also thermal generating facilities, many of the job skills are transferable. Unlike solar panels and wind turbines, an advanced nuclear facility creates hundreds of sustained, high-paying, and directly-related skilled jobs for a community. However, the regulatory process can be daunting for areas going from fossil-based to nuclear-based thermal generation; policies that make this option more accessible are crucial.

> **Recommendation:** Amend the Nuclear Energy Innovation Capabilities Act of 2017 to give energy communities access to the Advanced Nuclear Energy Licensing and Cost-Share Grant program for early site permits.

International Regulatory Coordination, Support, and Harmonization

Increase international cooperation and leverage harmonized reviews.

New nuclear energy will have a global impact, and regulatory practices can be shared to strengthen international partnerships, accelerate the learning curve of global regulators to improve safety and security, and ease the burden on U.S. innovators deploying internationally.

Furthermore, as Russia and China dominate the current nuclear energy market, it is critically important that the United States remains a global leader. Regulation plays a role, and the NRC cannot be a passive observer.

> **Recommendation:** Expand the NRC's authority to coordinate international and interagency cooperation, including –
>
> a) efforts to pursue regulatory harmonization and compatibility with non-U.S. regulators;
> b) exchange programs and training activities; and
> c) joint reviews of regulations with trusted international partners to create consensus codes and standards.
>
> **Recommendation:** Require the NRC to incorporate and leverage harmonized license reviews performed by non-U.S. regulators.

Fee Modernization to Unlock Innovation

Commence a study to assess NRC funding.

The NRC's current fee structure inhibits innovation. High costs, now $300/staff-hour in Fiscal Year 2023,[11] create a significant barrier to new entrants. Additionally, this fee-based system, in which the NRC is responsible for recovering 100% of its total budget authority except for specific fee relief activities,[12] prevents the NRC from proactively considering and implementing actions with long-term benefits. This stifles a culture of innovation and continuous improvement. While there are several recent proposals[13] on modifying the NRC's fee structure, this would be a significant effort. A study to recommend a long-term structural change that enables a proactive and innovative NRC should be considered; otherwise, most of the modernization efforts proposed will not be successful.

> **Recommendation:** Require a review that results in a report to study current NRC funding and make recommendations to improve the long-term fee structure to ensure that –
>
> a) the fee structure is not an unnecessary barrier to new entrants;
> b) any fee restructuring does not impose overly burdensome fees on existing licensees;[14]
> c) the NRC has sufficient resources to meet its safety and security mission;
> d) the NRC fosters a culture of innovation and continuous improvement;
> e) decision making is efficient, effective and predictable; and

---

[11] https://www.federalregister.gov/documents/2023/03/03/2023-03940/revision-of-fee-schedules-fee-recovery-for-fiscal-year-2023

[12] https://www.congress.gov/bill/115th-congress/senate-bill/512/text (Sec. 102)

[13] https://www.nuclearinnovationalliance.org/unlocking-advanced-nuclear-innovation-role-fee-reform-and-public-investment

[14] In FY23, the annual fee on operating large light water reactors is $5,753,000. While the NRC has proposed annual fee changes for smaller reactors, any long term change will need to ensure that it does not impose overly burdensome annual fees on the variety of reactor designs under development.

f) the study considers funding models for similar regulatory agencies, international regulatory agencies, and private industries which regularly bill hours.

Implement interim changes to NRC fees.

Before implementing the best long-term path forward to modify the NRC's fee structure, there are near-term, straightforward, and simple changes to the fee structure that would significantly improve the circumstances. Implementing these changes will minimize barriers to early entrants and lay the groundwork for a culture of continuous improvement at innovation at the NRC.

> **Recommendation:** Give small businesses an option to delay collection on a portion of their application fees that are accumulated until they begin operation.
> **Recommendation:** Remove generic, cross-cutting, and broadly-applicable regulatory processes from the fee base in order to reduce the fee burden on specific applicants or licensees. In addition, allow the NRC staff to perform administrative and preparatory activities apart from its safety-critical licensing and oversight activities.
> **Recommendation:** Amend the Nuclear Energy Innovation and Modernization Act to extend the duration of time that new regulatory infrastructure development for advanced nuclear reactor technologies is a fee-relief activity.

Remove the administrative burden from technical staff.

The cost restriction placed on centrally managed activities, imposed through previous legislation, has unintentionally led to the underutilization of human capital. Due to decreased administrative and support staff, technical staff now perform additional administrative tasks. If related to a license application or licensee, then it's likely that these costs are directly passed along to companies as fees. It is important that the NRC has robust corporate support so the NRC's technical experts are not overly burdened by performing administrative tasks.

Finally, other challenges around corporate support have been identified, including reductions to staff that directly support the Commissioners on legal matters, adjudicatory matters, and public affairs.[15] Removing corporate support from the fee base eliminates these challenges and provides Congress with greater oversight.

> **Recommendation:** Amend the definition of corporate support costs, remove the cost cap on centrally managed activities, and remove those activities from the fee base.

Advisory Committee on Reactor Safeguards Modernization

Modernize the role of the Advisory Committee on Reactor Safeguards (ACRS).

The ACRS plays an important role. However, currently, the ACRS is required to review every application for a new reactor as well as other topics. In the short term, this presents a significant

[15] Letter to the Honorable Thomas R. Carper, et al., submits the NRC's report on NEIMA - Implementation, Impacts, and Recommendations for Improvement on the NRC's Annual Budget Justification; Fees and Charges; Performance Reporting and Milestones; and Accurate Invoicing https://www.nrc.gov/docs/ML2123/ML21238A132.pdf https://www.nrc.gov/docs/ML2123/ML21237A033.pdf

bottleneck to licensing new reactors, especially if the review covers technologies or topics that are well understood or have no impact on safety and security. Furthermore, after a design has significant operating experience, an ACRS review may not be necessary. Additionally, there should be greater flexibility for the Commissioners to seek input when warranted, such as for new and novel features or applications of nuclear energy technology. These changes would empower ACRS to focus on the highest-impact areas.

> **Recommendation:** Amend the scope of the role of the Advisory Committee on Reactor Safeguards so it can better perform its important role within the NRC and retain its core statutory functions.
> **Recommendation:** Reduce the administrative and bureaucratic burden on the ACRS by making a review of a portion of an application contingent on a Commission request.

Part 53 and other Rulemakings

The Nuclear Energy Innovation and Modernization Act (NEIMA) directed the NRC to develop a technology-inclusive framework for advanced reactor licensing. The rule development process started in November 2020. In March 2023, the NRC published its draft proposed rule for licensing advanced nuclear reactors for the NRC Commissioners to review and vote on. Unfortunately, despite the thoughtful comments from stakeholders and future licensees, the draft proposed rule does not enable the rapid deployment of new nuclear technologies.[16]

While the draft proposed rule falls short, the principles of NEIMA are still valid, and ClearPath Action currently does not believe legislation is required on the topic of Part 53. There must be robust Congressional oversight to get Part 53 in line with its mandate in NEIMA. Furthermore, speed should not take priority over a successful rule, and the Committee should balance these two priorities in its oversight of the NRC. Finally, there are additional important ongoing and future rulemakings beyond Part 53, for which this Committee should oversee proper implementation.

> **Recommendation:** Continued Committee oversight over the Part 53 rulemaking, other important rulemakings, and NRC actions.

[16] https://clearpath.org/our-take/new-nuclear-energy-needs-new-licensing-process/

Idaho National Laboratory

April 26, 2023

The Honorable Cathy McMorris Rodgers
Chair, Energy and Commerce Committee
House of Representatives
2125 Rayburn House of Representatives
Washington, DC 20510

The Honorable Frank Pallone, Jr.
Ranking Member, Energy and Commerce Committee
House of Representatives
2125 Rayburn House of Representatives
Washington, DC 20510

The Honorable Jeff Duncan
Chair, Subcommittee on Energy, Climate, and Grid Security
House of Representatives
2125 Rayburn House of Representatives
Washington, DC 20510

The Honorable Diana DeGette
Ranking Member, Subcommittee on Energy, Climate, and Grid Security
House of Representatives
2125 Rayburn House of Representatives
Washington, DC 20510

SUBJECT: Response to April 14, 2023 Request for Information - Nuclear Regulatory Committee Improvements Report

Dear Chairwoman McMorris Rodgers, Chairman Duncan, and Ranking Members Pallone and DeGette:

Thank you for your interest in and support for nuclear energy and your efforts to ensure regulation, licensing and oversight of nuclear systems and technologies that are effective and efficient and serve the interests of the nation. As the Director of Idaho National Laboratory – the nation's center for nuclear energy research, development, and demonstration – I very much appreciate the opportunity to provide our input to your Subcommittee's considerations to improve the Nuclear Regulatory Commission (NRC) licensing review and approval processes.

The United States benefits from having an agency such as the NRC, which is viewed internationally as the leader in nuclear safety licensing and regulation. While acknowledging the NRC's important role and reputation, it is apparent that one of the most significant time and resource intensive activities for developers of new nuclear systems, including advanced nuclear reactors, is the NRC licensing process. The time and cost to obtain NRC licenses represent significant fractions of the total time and cost for new nuclear projects and may result in abandonment of projects or failure to even begin new projects. This situation presents a particularly troublesome risk for the nation given the urgency in which utilities and other significant energy generators are working to transition to clean, firm, non carbon-emitting energy sources like nuclear energy.

Thankfully, reforms to the NRC licensing process have the potential to greatly increase efficiency and predictability and support the successful progress of new reactors. I believe that the NRC can retain its world-class nuclear safety reputation while becoming a world leader for regulatory efficiency and a critical enabler to the clean energy transition. The attached report describes potential NRC reforms, focusing on those with a statutory connection. Recognizing the potential tradeoffs with any proposed changes, the report attempts to highlight those considerations in the analysis of the reforms. The recommendations are presented as a set of options for consideration. Although difficult to calculate precise time improvements for some of the changes, the reforms have the potential for substantial improvements, perhaps even by a factor of two.

We believe that reforms to the NRC licensing process will help ensure that the U.S. remains the world leader in nuclear energy development and deployment and help enable a global clean energy transition. Again, thank you for your subcommittee's interest in this critically important topic and for the opportunity to provide input to your efforts.

Sincerely,

John C. Wagner, Ph.D.
Director, Idaho National Laboratory
and President, Battelle Energy Alliance, LLC

ALH:MRR

Attachment: Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process

INL/RPT-23-72206
Revision 0

Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process

April 2023

Stephen J. Burdick, J.D.

Dr. John C. Wagner

Dr. Jess C. Gehin

Idaho National Laboratory

INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance, LLC

INL/RPT-23-72206
Revision 0

Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process

April 2023

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Idaho Falls, Idaho 83415

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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
ARDP	Advanced Reactor Demonstration Program
ASLB	Atomic Safety and Licensing Board
BEA	Battelle Energy Alliance, LLC
COL	Combined License
CP	Construction Permit
DCA	Design Certification Application
DOE	Department of Energy
EIS	Environmental Impact Statement
ERA	Energy Reorganization Act
ERDA	Energy Research and Development Administration
ESP	Early Site Permit
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FFRDC	Federally Funded Research and Development Center
FOCD	Foreign Ownership, Control, or Domination
GEIS	Generic Environmental Impact Statement
INL	Idaho National Laboratory
LWA	Limited Work Authorization
LWR	Light Water Power Reactor
MARVEL	Microreactor Applications Research, Validation, and Evaluation
M&O	Management and Operations
NEIMA	Nuclear Energy Innovation and Modernization Act
NEPA	National Environmental Policy Act
NPUF	Nonpower Production or Utilization Facility
NRC	Nuclear Regulatory Commission
OL	Operating License
PAA	Price-Anderson Act
R&D	Research and Development

SER	Safety Evaluation Report
TRISO	Tristructural Isotropic

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Recommendations to Improve the Nuclear Regulatory Commission Reactor Licensing and Approval Process

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.

Due to the urgency around climate change and associated goals for clean energy transition, as well as BEA's role described above, numerous stakeholders have asked for BEA's thoughts and recommendations to improve the U.S. Nuclear Regulatory Commission's (NRC)[a] licensing review and approval process. On April 14, 2023, the House Committee on Energy and Commerce requested BEA input 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."

As an M&O contractor for an FFRDC, BEA is a long-term partner with the Government in seeking to achieve clean energy goals, yet has a level of independence needed to appropriately evaluate the above 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 an agency such as the NRC, which is viewed internationally as the leader in nuclear safety licensing and regulation. Nonetheless, while acknowledging the important nuclear safety role provided by the NRC, it is apparent that one of the most significant time and resource intensive activities for developers of new nuclear systems, including advanced nuclear reactors, is the NRC licensing process. The time and cost to obtain NRC licenses represent significant fractions of the total time and cost for new nuclear projects and may result in abandonment of projects or failure to even begin new projects. The challenge is particularly acute for advanced reactors which may raise unique or new regulatory questions and may be smaller in size, resulting in a much higher proportional impact from the time and costs associated with NRC licensing. This situation presents a particularly troublesome risk for the nation given the urgency in which utilities and other significant energy generators are working to transition to clean, firm, non-carbon-emitting energy sources like nuclear energy.

Thankfully, reforms to the NRC licensing process have the potential to greatly increase efficiency and predictability and support the successful progress of new reactors. The NRC can retain its world-class nuclear safety reputation while becoming a world leader for regulatory efficiency and a critical enabler to the clean energy transition. This report describes potential NRC reforms, focusing on those with a statutory connection. Recognizing the potential tradeoffs with any proposed changes, the 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. Although difficult to calculate precise time improvements for some of the changes, the reforms have the potential for substantial improvements,

a. 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.

perhaps even by a factor of two. As an example, the first reform discussed below—removal of mandatory hearings—would directly reduce the timeframe for certain licensing actions by about half a year.

As described in more detail in Section 2 below, the following changes should facilitate the licensing of new reactors at the NRC:

- **Reforms to Streamline NRC Hearings**

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.

2.1.2. Remove the NRC contested hearing opportunity on environmental topics to align with the traditional public comment and challenge process under the National Environmental Policy Act (NEPA).

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.

- **Reforms to Expedite NRC Safety and Environmental Reviews**

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.

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

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.

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.

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.

- **Reforms to Otherwise Improve NRC Licensing**

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.

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

- **Reforms to Provide Financial Benefits to New Reactor Projects**

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

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.

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

BEA also recognizes other ongoing efforts to improve the NRC licensing process. As an example, a bipartisan group of senators recently introduced the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act of 2023.[b] Although not its entire focus, the ADVANCE Act includes provisions that would substantially benefit the NRC licensing process. All of those provisions are not repeated herein, but some of them are discussed below in the context of the suggested reforms in this report.

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

2. AREAS OF REFORM FOR NRC NEW REACTOR LICENSING

2.1. Reforms to Streamline NRC Hearings

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 Atomic Energy Act of 1954, as amended (AEA),[c] 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."[d] 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 to an Atomic Safety and Licensing Board (ASLB). 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 includes written questions and responses, written testimony, and an in-person hearing with sworn witnesses. The process concludes with a decision by the presiding officer.[e]

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. In fact, past mandatory hearings have taken 4-7 months to complete, directly adding this delay to the licensing action. This is shown below in Table 1. The table lists projects subject to mandatory hearings

b. *See, e.g.*, Carper, Capito, Whitehouse Introduce Bipartisan Nuclear Energy Bill, the ADVANCE Act (Apr. 3, 2023), https://www.epw.senate.gov/public/index.cfm/2023/4/carper-capito-whitehouse-introduce-bipartisan-nuclear-energy-bill-the-advance-act.

c. Public Law 83-703, 68 Stat. 919, 42 U.S.C. § 2011 et seq.

d. 42 U.S.C. § 2239(a)(1)(A).

e. *See generally* Internal Commission Procedures, Ch. IV, at 11 (Aug. 2016), *available at* https://www.nrc.gov/docs/ML1625/ML16250A666.pdf#page=11.

held during the past 15 years, including ESPs for new reactors, COLs for new reactors, and CPs for medical isotope facilities. This timeframe was selected because it covers most of the 10 C.F.R. Part 52 new reactor projects subject to mandatory hearings, as well as projects which used the NRC's current procedures for mandatory hearings. For each project, the table identifies the date the later of the SER or EIS was issued (representing the end of the NRC Staff review), the date of the licensing action, and the resulting delay due to the mandatory hearing. The table is organized chronologically according to the second column. As shown in the fourth column, the delay due to the mandatory hearing ranged from 4-7 months, but the delay was most frequently six months.

Table 1. Information on recent NRC mandatory hearings.

Project	Last of SER/EIS Issued	License/Permit Issuance	Mandatory Hearing Delay	Presiding Officer	Different Findings Based on Mandatory Hearing?
Vogtle ESP & LWA[f]	2/2009	8/26/2009	6 months	ASLB	No
Vogtle 3&4 COL[g]	8/2011	2/10/2012	6 months	Commission	No, but added conditions primarily due to Fukushima
Summer 2&3 COL[h]	8/2011	3/30/2012	7 months	Commission	No, but added conditions primarily due to Fukushima
Fermi 3 COL[i]	11/2014	5/1/2015	6 months	Commission	No
STP 3&4 COL[j]	9/2015	2/12/2016	5 months	Commission	No
SHINE CP[k]	10/2015	2/29/2016	4 months	Commission	No
PSEG ESP[l]	11/2015	5/5/2016	6 months	ASLB	No
Levy 1&2 COL[m]	5/2016	10/26/2016	5 months	Commission	No

f. Issued Early Site Permit – Vogtle Site, https://www.nrc.gov/reactors/new-reactors/large-lwr/esp/vogtle.html.

g. Issued Combined Licenses and Limited Work Authorizations for Vogtle, Units 3 and 4, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/vogtle.html.

h. Combined Licenses for Virgil C. Summer Nuclear Station, Units 2 and 3, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/summer.html.

i. Application Review Schedule for the Combined License Application for Fermi, Unit 3, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/fermi/review-schedule.html.

j. Issued Combined Licenses for South Texas Project, Units 3 and 4, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/south-texas-project.html.

k. SHINE Medical Technologies, LLC, https://www.nrc.gov/info-finder/nonpower/shine-medical-tech.html.

l. Issued Early Site Permit – PSEG Site, https://www.nrc.gov/reactors/new-reactors/large-lwr/esp/pseg.html.

m. Issued Combined Licenses for Levy Nuclear Plant, Units 1 and 2, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/levy.html.

Project	Last of SER/EIS Issued	License/Permit Issuance	Mandatory Hearing Delay	Presiding Officer	Different Findings Based on Mandatory Hearing?
Lee 1&2 COL[n]	8/2016	12/19/2016	4 months	Commission	No
Turkey Point 6&7 COL[o]	11/2016; revised hearing notice 10/2017 after consultations and hurricane delays	4/12/2018	6 months, based on revised hearing notice	Commission	No
North Anna 3 COL[p]	1/2017	6/2/2017	5 months	Commission	No
Northwest Med. Isotopes CP[q]	11/2017	5/9/2018	7 months	Commission	No
Clinch River ESP[r]	6/2019	12/19/2019	6 months	Commission	No

Finally, the table identifies the presiding officer for the mandatory hearings and whether the mandatory hearing resulted in any findings different than the NRC Staff review.

In addition to the significant delays from mandatory hearings discussed above, the hearings also serve little purpose. The applications related to these mandatory hearings already are subject to significant review from other sources, examples include:

- These applications typically undergo thousands of hours of review by hundreds of NRC Staff reviewers with substantial subject matter expertise.
- AEA Section 29 established an Advisory Committee on Reactor Safeguards (ACRS) to "review safety studies and facility license applications referred to it . . . ."[s] Under current practice, the ACRS reviews all new reactor applications over many months with many meetings with the NRC Staff and applicant. Under a change proposed below in Section 2.2.2, the ACRS review would be narrower in scope than this current practice, but it still would cover unique or new safety issues posing potential hazard.

n. Issued Combined Licenses for William States Lee III Nuclear Station, Units 1 and 2, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/lee.html.

o. Issued Combined Licenses for Turkey Point, Units 6 and 7 Application, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/turkey-point.html.

p. Issued Combined Licenses for North Anna, Unit 3, https://www.nrc.gov/reactors/new-reactors/large-lwr/col/north-anna.html.

q. Northwest Medical Isotopes, LLC, https://www.nrc.gov/info-finder/nonpower/nw-medical-isotopes.html.

r. Issued Early Site Permit – Clinch River Nuclear Site, https://www.nrc.gov/reactors/new-reactors/large-lwr/esp/clinch-river.html.

s. 42 U.S.C. § 2039.

- The entirety of each application is subject to challenge by any person. In fact, most of the above applications were challenged through the contested hearing opportunity.
- The applications are subject to numerous public meetings and opportunities for public comment.

The Commission should be permitted to rely on the review by its experts and the open opportunity for any member of the public to review and challenge the applications.

Importantly, none of the mandatory hearings identified above reached a different conclusion from the NRC Staff on the findings needed to support the licensing action. In other words, the results of all these licensing actions were not impacted by the mandatory hearings. This finding is not surprising given the thorough review performed by the NRC Staff and the ACRS (even with the limited scope proposed in Section 2.2.2 below for the ACRS).

Perhaps the only direct value of a mandatory hearing is possibly to educate the Commission on an application. This education, however, can be and typically is performed outside of the mandatory hearing process. Indeed, the Commission should be informed of pending applications well before the NRC Staff completes its review. Feedback from the Commission information briefings can be considered during the licensing review process rather than lengthening the critical path for the licensing action. If the Commission finds value in informational meetings, there is no statutory or regulatory bar preventing it from holding such meetings during the application review. The Commission's decision to delegate the mandatory hearings to the ASLB in some cases further shows the lack of value of the mandatory hearing from an educational standpoint.[t]

In summary, although the mandatory hearing process may have been helpful many decades ago while licensing the first commercial nuclear reactors, that usefulness is long gone given the extensive experience with the licensing process. The mandatory hearings result in significant delay to CP, LWA, ESP, and COL licensing actions without a corresponding benefit. Any benefit can be addressed through other informational meetings held during the NRC's review. The mandatory hearing obligation should be removed from the AEA.

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

AEA Section 189a.(1)(A) states: "In any proceeding under this Act, for the granting, suspending, revoking, or amending 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."[u]

As implemented, the NRC provides a very broad and, in some cases, duplicative opportunity for persons to challenge applications of all types. The NRC's rules of practice and procedure are found in 10 C.F.R. Part 2. Those rules generally allow a person to challenge any portion of an application, including the environmental report submitted by the applicant, if their interests are affected by the project.[v] On issues arising under NEPA, persons also may challenge the NRC's review document (e.g., Environmental Assessment, EIS).[w]

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t. *See, e.g.*, Staff Requirements – SECY-21-0107 – Selection of Presiding Officer for Mandatory Hearings Associated with Construction Permit Applications (Mar. 23, 2022), *available at* https://www.nrc.gov/docs/ML2208/ML22083A045.pdf (approving delegation of presiding officer role for mandatory hearings to ASLB, except for the first for each advanced reactor technology design).

u. 42 U.S.C. § 2239(a)(1)(A).

v. *See* 10 C.F.R. §§ 2.309(a), (f)(2).

w. *See* 10 C.F.R. § 2.309(f)(2).

This ability to challenge the NEPA review through a Commission-granted hearing exceeds the typical practice for NEPA reviews for other federal actions. Normally, members of the public can participate in significant NEPA reviews through a public scoping process, comments on draft NEPA review documents, and federal court challenges.[x] The NRC process provides these public input opportunities in addition to the hearing process.[y]

Challenges to environmental issues as part of a contested hearing process have the potential to cause significant delay to the NRC's review. If an environmental issue proceeds to an evidentiary hearing, then that hearing typically would not commence until after issuance of the NRC's environmental review document.[z] Depending on the circumstances, the contested hearing process could be on the critical path of the licensing action and could result in a delay of a year or more for the hearing and appeal activities.[aa] The participation opportunities through the public scoping and comment process more appropriately occur during the NRC's preparation of its NEPA review document.

Removing the ability to challenge NEPA issues in the contested hearing process would remove redundancy and minimize potential for delay during application reviews while retaining public participation opportunities.

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 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."[bb] 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 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

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x. *See, e.g.*, EPA, How Citizens can Comment and Participate in the National Environmental Policy Act Process (describing NEPA public participation opportunities, including public scoping and public comment), https://www.epa.gov/nepa/how-citizens-can-comment-and-participate-national-environmental-policy-act-process; CRS Report, National Environmental Policy Act: Judicial Review and Remedies (Sept. 22, 2021) (describing judicial review for NEPA claims against federal agencies and established remedies for successful claims), *available at* https://crsreports.congress.gov/product/pdf/IF/IF11932.

y. *See generally* 10 C.F.R. Part 51; 10 C.F.R. § 2.309.

z. *See* 10 C.F.R. § 2.332(d).

aa. One example of this type of delay is the Turkey Point COL proceeding. The NRC completed the EIS for the project in October 2016 with a supplement in December 2016 and completed the Final Safety Evaluation Report in November 2016. *See Fla. Power & Light Co.* (Turkey Point Nuclear Generating Units 6 & 7), CLI-18-1, 87 NRC 39, 50-51 (2018). Thereafter, the ASLB held an evidentiary hearing on a contention related to wastewater injection and issued its decision on July 10, 2017, about nine months after the EIS. *See generally Fla. Power & Light Co.* (Turkey Point Units 6 & 7), LBP-17-5, 86 NRC 1 (2017). The NRC, however, did not issue the COLs until April 2018 due to other delays which postponed the mandatory hearing. *See Turkey Point*, CLI-18-1, 87 NRC at 51.

bb. 42 U.S.C. § 2239(a)(1)(A).

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*.[cc] 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.[dd]
- 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*."[ee] 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.[ff]
- The above disclosure requirements are continuing and must be updated monthly.[gg]
- The parties may prepare and respond to motions related to the proceeding, including motions for summary disposition.[hh]
- The parties may file new or amended contentions throughout the NRC review, which if admitted, may multiply the hearing burdens.[ii]
- 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.[jj]
- The parties typically must prepare for and participate in oral hearings with the presiding officer.[kk]
- The parties may then appeal decisions to the Commission first and then to the federal courts.[ll]

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

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cc. 10 C.F.R. §§ 2.336(b), 2.1203.

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

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

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

gg. 10 C.F.R. § 2.336(d).

hh. 10 C.F.R. §§ 2.1204, 2.1205.

ii. 10 C.F.R. § 2.309(c).

jj. 10 C.F.R. §§ 2.1207(a), 2.1210.

kk. 10 C.F.R. § 2.1207(b).

ll. 10 C.F.R. § 2.1212.

relevant safety topics or the Final EIS for environmental topics.[mm] 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.[nn] 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.

2.2. Reforms to Expedite NRC Safety and Environmental Reviews

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.

The AEA provided the foundational requirements for the licensing of nuclear reactors, including leadership and oversight by the Atomic Energy Commission (AEC). Among its purposes, the AEA includes "[a] program of conducting, assisting, and fostering research and development in order to encourage maximum scientific and industrial progress" and "[a] program to encourage widespread participation in the development and utilization of atomic energy for peaceful purposes . . . ."[oo] Under the AEA, the AEC supported both research and development (R&D) and commercial licensing activities.

The Energy Reorganization Act of 1974, as amended (ERA),[pp] abolished the AEC and generally split its functions into two new agencies. First, the ERA established the Energy Research and Development Administration (ERDA) as an independent executive agency to, among other things, support nuclear R&D.[qq] ERDA was charged with "encouraging and conducting research and development . . . related to the development and use of energy from . . . nuclear . . . sources."[rr] Second, the ERA established the NRC as an independent regulatory commission to generally perform the AEC's licensing and related regulatory

mm. 10 C.F.R. § 2.332(d).

nn. *See* 10 C.F.R. §§ 2.1506, 2.1507.

oo. 42 U.S.C. § 2013.

pp. Public Law 93-438, 88 Stat. 1233, 42 U.S.C. § 5801 et seq.

qq. 42 U.S.C. §§ 5801(b), 5811, 5813. The Department of Energy Organization Act of 1977, as amended, Public Law 95-91, 91 Stat. 565, 42 U.S.C. § 7101 et seq., established DOE within the executive branch and transferred all of the functions of ERDA into DOE. 42 U.S.C. §§ 7131, 7151.

rr. 42 U.S.C. § 5813(2).

functions separate from ERDA.[ss] Subject to other provisions, the NRC was given "principal licensing and regulation" authority for all reactors, materials facilities, and materials licensed under the AEA.[tt]

In creating the NRC, the ERA did not identify a clear mission statement. Instead, the ERA broadly stated in Section 2(c): "The Congress finds that it is in the public interest that the *licensing and related regulatory functions* of the Atomic Energy Commission be separated from the performance of the other functions of the Commission . . . ."[uu] ERA Section 201(a)(1) further states: "There is established an *independent regulatory commission* to be known as the Nuclear Regulatory Commission . . . ."[vv]

These limited statements have resulted in an NRC focused on licensing and regulatory issues from a safety standpoint with little direction as to how those activities are to be conducted. Indeed, the NRC's own mission statement states: "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."[ww] While addressing important topics, this mission of health and safety provides the NRC with little motivation to undertake its activities with a focus on timeliness and efficiency. This is not to say that the NRC entirely ignores timeliness and efficiency, but that these are lesser priorities and are not considered in all activities.

It is possible to argue that promoting common defense and security and similar mission statements imply a notion of urgency. The need to expedite the deployment of nuclear energy to support the nation's carbon-free energy objectives together with nuclear energy's proven ability to provide reliable energy security even during stressful circumstances should invoke adherence to "common defense and security." Nonetheless, that urgency is not apparent.

A slight modification to the statutory mission of the NRC to incorporate a timeliness and efficiency focus could greatly improve the speed and success of new reactor licensing activities and other NRC activities. Ensuring public health and safety remain the prime NRC objectives, but with improved metrics that foster timely and efficient reviews and decisions, would drive the NRC to increase productivity and shorten its licensing reviews. A modified mission statement and associated metrics would help the NRC identify internal changes that it is responsible for and responsive to.

Precedent exists for other agencies with a safety mission to also proceed in an expeditious and efficient manner. For example, the Federal Aviation Administration (FAA) states: "Our continuing mission is to provide the safest, *most efficient* aerospace system in the world."[xx] Similarly, the FAA's vision states: "We strive to reach the next level of safety and *efficiency* and to demonstrate global leadership in how we safely integrate new users and technologies into our aviation system. We are accountable to the American public and our aviation stakeholders."[yy] This mission and vision is consistent with the FAA statutory obligations, which repeatedly refer to conducting its activities efficiently.[zz]

As another example, the U.S. Food and Drug Administration (FDA) states the following as part of its mission: "FDA is responsible for advancing the public health by *helping to speed innovations* that make medical products more effective, safer, and more affordable and by helping the public get the accurate,

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ss. 42 U.S.C. §§ 5801(c), 5841(a)(1).

tt. 42 U.S.C. §§ 5843(b)(1), 5844(b)(1).

uu. 42 U.S.C. § 5801(c) (emphasis added).

vv. 42 U.S.C. § 5841(a)(1) (emphasis added).

ww. *See* About NRC, https://www.nrc.gov/about-nrc.html.

xx. *See* Mission, https://www.faa.gov/about/mission (emphasis added).

yy. *See id.* (emphasis added).

zz. *See, e.g.*, 49 U.S.C. § 106(b) (stating that the Administrator must "carry out efficiently the duties and powers of the office"), § 106(p)(7)(E)(i) (stating the Air Traffic Services Board must consider efficient operation of the FAA). Additionally, Section 221 of Pub. L. 104-264 includes a Congressional finding that "The Administration must become a more efficient, effective, and different organization to meet future challenges." 49 U.S.C. § 106 note.

science-based information they need to use medical products and foods to maintain and improve their health."[aaa] The need for speeding innovations at the FDA to support public health is similar to the need for speeding innovations at the NRC to support public health related to the provision of carbon-free baseload power sources. Similar to the FAA, the FDA's mission is consistent with statutory obligations which also address timely and efficient action.[bbb]

The two agencies discussed above—FAA and FDA—are particularly relevant to discussing the mission of the NRC, because those agencies also have important safety missions. The inclusion of a timely and efficiency component in their missions does not appear to have had any detrimental impact on their safety missions.

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 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:

> 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.[ccc]

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.[ddd]

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.[eee] In some busy licensing years, this can result in

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aaa. What We Do, https://www.fda.gov/about-fda/what-we-do (emphasis added).

bbb. *See, e.g.*, 21 U.S.C. § 393(b) (stating that the mission of the FDA includes "promote the public health by promptly and efficiently reviewing clinical research and taking appropriate action on the marketing of regulated products in a timely manner").

ccc. 42 U.S.C. § 2039.

ddd. 42 U.S.C. § 2232(b).

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

approximately 80 meetings and 70 reports by the ACRS.[fff] 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.[ggg] 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 the approval and deployment of nuclear power plants with advanced safety features.[hhh]

It is challenging to determine the specific cost and delay due to excessive ACRS meetings as 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 only review items the Commission refers to it and that the Commission should only refer 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 would require a specific referral from the Commission to the ACRS specifying issues to be reviewed. This balance should allow the NRC to continue to benefit from the

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fff. *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.

ggg. 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) ("NuScale Lessons-Learned Report"), *available at* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML21050A431.

hhh. *Id.* at 2.

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.

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.

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.[iii] 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 responsibilities without undue administrative burden."[jjj] 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:[kkk]

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.[lll] 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

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

jjj. *Id.* at 14,965.

kkk. *Id.* at 14,967.

lll. *Id.* at 14,965.

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. With the current public meeting practices, it is not surprising that NRC reviews are so lengthy and costly.

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 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.

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.

One of the most significant costs and burdens of new reactor licensing projects is compliance with the requirements of NEPA, which generally requires environmental review of federal actions. The NRC has taken some important steps to reduce the challenge of NEPA activities for advanced reactors. As one example, the NRC is developing a Generic Environmental Impact Statement (GEIS) for advanced reactors which would perform a generic and bounding analysis of certain environmental topics.[mmm] This has the potential to significantly reduce both the effort required by an applicant to prepare the environmental content of its application and the effort by the NRC Staff to review the environmental impacts and prepare its NEPA documentation. In order to provide a benefit to most advanced reactor applicants, the NRC must ensure that the GEIS is completed expeditiously.

Additional refinements to NEPA reviews are possible. For example, the NEPA review requirement can be particularly frustrating for projects which have very low likelihood of any significant environmental impact, such as smaller non-commercial reactor projects on existing DOE sites. These projects typically will only impact existing facilities/buildings, previously disturbed land, and/or well-characterized areas. Depending on other circumstances, these projects could be subject to either DOE authorization or NRC licensing.

Recent experience with NEPA reviews for small reactors at INL has shown very low potential environmental impacts under these scenarios. For example, in June 2021, DOE issued an Environmental Assessment for the Microreactor Applications Research, Validation, and Evaluation (MARVEL) project.[nnn] The MARVEL project involves a 100-kilowatt thermal microreactor and is intended to offer experimental capabilities for performing R&D on various operational features of microreactors and improving integration of microreactors to end-user applications, such as off-grid electricity generation and process heat.[ooo] Following the environmental review, DOE concluded: "Implementing the MARVEL microreactor would result in small adverse impacts to the environment. However, these impacts, in

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mmm. *See* Advanced Nuclear Reactor Generic Environmental Impact Statement (GEIS), https://www.nrc.gov/reactors/new-reactors/advanced/rulemaking-and-guidance/advanced-reactor-generic-environmental-impact-statement-geis.html.

nnn. 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.

ooo. *Id.* at 2-3.

conjunction with other past, present, and reasonably foreseeable future actions, would not result in discernible cumulative impacts."[ppp]

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.[qqq] As reviewed, Project Pele would be capable of producing 1 to 5-megawatts electric and would be a small, advanced gas-cooled reactor using high-assay low-enriched uranium tristructural isotropic (TRISO) fuel and air as the ultimate heat sink.[rrr] Following the environmental review, 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."[sss]

Given the low likelihood of any significant impacts and the need for fast progression of advanced reactor development, small non-commercial reactor projects on existing DOE sites should be statutorily excluded from the requirements of NEPA. A threshold of 20 megawatts thermal is an appropriate cut-off for a small project as this should encompass projects intended for research, development, and demonstration and should ensure that the environmental impacts are kept small. Removing the NEPA requirements for these small 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, such as the National Historic Preservation Act, which should address any potential environmental impacts.

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.[ttt]

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.[uuu] Similar to this example related to rebuilding assistance after an emergency, the basis for excluding small reactors from NEPA would be the need to rapidly progress advanced reactor projects given their important benefits to the nation. This recommendation is applicable whether a project is subject to DOE authorization or NRC licensing.

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ppp. *Id.* at 51.

qqq. 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.

rrr. *Id.* at 1-3 to 1-4.

sss. *Id.* at 5-6.

ttt. 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.

uuu. *Id.* at 7-8.

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.

Although there are some good opportunities to make the NRC new reactor licensing process more efficient with the statutory changes identified in this report, these do not directly address all of the day-to-day delays during a licensing review that contribute to the overall long duration to obtain a new reactor license. Many of those delays appear to involve excessive reviews of non-safety significant topics, a rigid interpretation of what constitutes reasonable assurance, excessive "confirmatory" analyses performed by NRC Staff, process challenges, etc.

As one example, the AEA and the NRC mission focus on whether activities provide a "reasonable assurance" of adequate protection of public health and safety. The reasonable assurance standard for licensing actions has been applied too rigidly, resulting in a standard of essentially perfection and zero risk. This has resulted in excessively lengthy licensing reviews. For example, NuScale stated the following based on the NRC review of its DCA:

> NuScale completed the first NRC review of an advanced reactor application, and overall the NuScale DCA review was a success. Staff completed review of the first small modular reactor design in 41 months following docketing of the application. The review was thorough; it involved over a quarter million review hours, about two million pages of documentation made available for review or audit, and about 100 gigabytes of test data. The ACRS conducted some 40 meetings totaling approximately 440 hours.[vvv]

This reasonable assurance standard should be clarified to ensure that it does not require absolute certainty or risk avoidance. In 2018, the NRC provided the following explanation of the reasonable assurance standard:

> The Atomic Energy Act of 1954, as amended, which authorizes and governs our work, does not specify the precise level of safety the Commission must assure or define the factors the Commission may or should consider in defining the appropriate level of safety. Instead, the AEA gives the Commission broad discretion to weigh and balance factors, such as the state of the art of nuclear safety, the risk of accidents, the record of past performance, and the need for further improvement in nuclear safety, along with other matters, in reaching licensing decisions.
>
> Similarly, the AEA does not define "reasonable" or "adequate." It does, however, contain language such as "adequate protection," "unreasonable risk," "minimize danger," and "inimical." "Adequate protection" focuses rather narrowly on radiological risk, and not on something broader. Looking at these terms to try to determine what "reasonable assurance" means, the NRC has historically inferred from these words that some risks may be tolerated and something less than absolute protection is required.
>
> The NRC implements the AEA through its regulations, and in cases challenging the agency's application and interpretation of its regulations, courts have agreed that absolute safety or zero risk is not required. Throughout our history, as technology has advanced, courts have recognized the Commission's broad discretion to balance the factors it deems relevant to determine what level of

vvv. NuScale Lessons-Learned Report, Enclosure, at 2.

> protection is adequate and reasonable in reaching licensing decisions. In addition, courts, including the U.S. Supreme Court, have recognized that nuclear technology continues to change and advance and what constitutes "reasonable assurance of adequate protection" will also change as the state of the art of nuclear safety advances. The Commission retains the authority to establish the level of protection that is adequate and reasonable.[www]

These statements are helpful to acknowledge that some risks may be tolerated and absolute protection is not required. With civil nuclear energy exceeding 60 years and with over 100 commercial nuclear reactors licensed and operated, the United States has significant experience that should be considered in licensing new reactors. This experience should allow the NRC to better identify risks and initiating situations that can lead to significant consequences to public health and safety. NRC studies also have refined their understanding of risks and causal factors due to accidents. This experience and the reasonable assurance standards mentioned above are particularly relevant as advanced reactors are expected to be safer than past generations of reactors. Reactors that incorporate passive safety features that enhance safety should see some benefit in the regulations, or there will be limited incentive to invest in such technologies, to only be reviewed in a similar manner as traditional reactors. It is not apparent, however, that the hands-on NRC reviewers are allowing this level of flexibility in their reviews.

Based on recent new reactor licensing experience, the NRC's review standards must be finetuned further to allow for the more efficient review of new reactor applications. This can be a challenge given that the review standards are manifested through the day-to-day review of applications by NRC Staff subject matter experts. However, one option to support this refinement is to establish a team of experts on the NRC review process without any responsibilities for a particular licensing review to shadow the review process and identify process improvements. To ensure a sufficient level of independence, the review team should be composed of outside experts rather than internal NRC employees. This independent assessment team could then provide reports to Congress and identify improvements by the NRC. This review should be performed in parallel with other changes discussed herein, so the time for the review does not hold up other improvements.

This review must ensure that the reasonable assurance standard is further clarified to account for an acceptable level of risk and to ensure that NRC decision-making is risk-informed. If it can be demonstrated, for example, that a fuel type is inherently safe (e.g., TRISO), a lower threshold of review should be applied, such as the test reactor standard in ANS 15.21, *Format And Content For Safety Analysis Reports For Research Reactors*.

2.3. Reforms to Otherwise Improve NRC Licensing

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.

The NRC licensing process for advanced reactors includes many different steps, starting with the pre-application activities (i.e., meetings, draft application review), followed by docketing and NRC Staff reviews and issuance of the SER and EIS, and concluding with issuance of a license. The following NRC flow chart illustrates the licensing process for a COL, as well as the construction period.[xxx] Although this chart applies to COLs, it includes many of the same steps as other NRC new reactor licensing actions.

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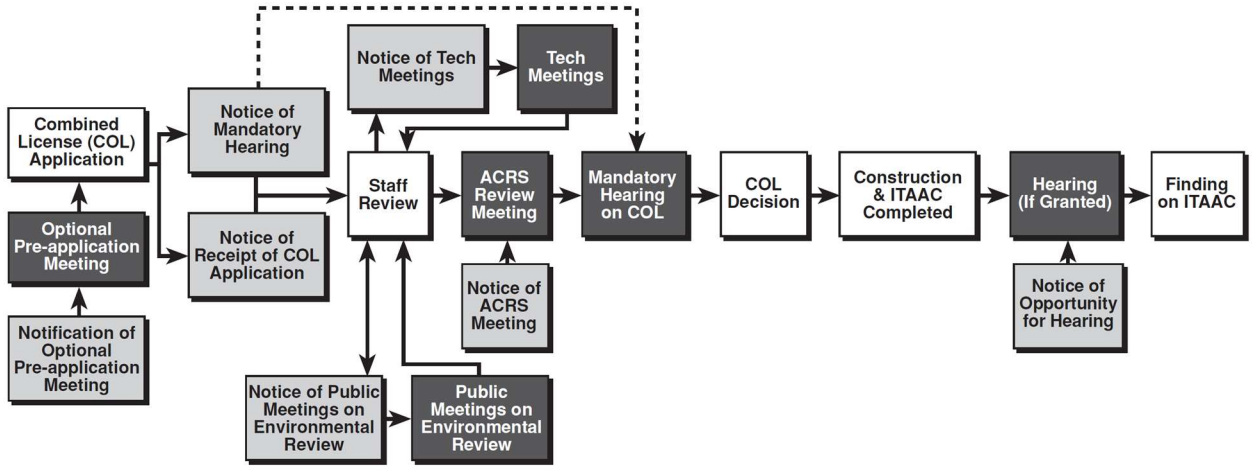
www. Memorandum from F. Brown, NRC, to New Reactor Business Line, Expectations for New Reactor Reviews, at 4-5 (Aug. 29, 2018), *available at* https://www.nrc.gov/docs/ML1824/ML18240A410.pdf.

xxx. NUREG/BR-0298, Nuclear Power Plant Licensing Process, at 11 (Rev. 2, July 2004), *available at* https://www.nrc.gov/docs/ML0421/ML042120007.pdf.

Figure 1. COL Licensing Process.



Section 102(c) of the Nuclear Energy Innovation and Modernization Act (NEIMA) required that the NRC develop performance metrics and milestone schedules for "requested activities of the Commission."[yyy] Section 3 of NEIMA defines requested activity of the Commission to include the processing of applications for (i) design certifications or approvals; (ii) licenses; (iii) permits; (iv) license amendments; (v) license renewals; (vi) certificates of compliances; and (vii) power uprates, as well as any other activity requested by a licensee or applicant.[zzz] The NRC developed generic milestone schedules of requested activities of the Commission and has posted them on its website.[aaaa] The generic milestone schedules for new reactor activities are shown below in Table 2.

Table 2. NRC new reactor generic milestone schedules.

Activity	Type	Generic Milestone to Issue Final Safety Evaluation
Design Certifications and Standard Design Approvals (including Topical Reports required to support the application and submitted in parallel or earlier than the application)	Light Water Power Reactor (LWR) – Part 52	42 months
	Non-LWR – Part 52	36 months
Licenses (including Topical Reports required to support the application and submitted in parallel or earlier than the application)	Operating (LWR) – Part 50	42 months
	Operating (Non-power production or utilization facility (NPUF) or Non-LWR) – Part 50	36 months
	Combined (LWR or non-LWR referencing a certified design) – Part 52	30 months
	Combined (LWR not referencing a certified design) – Part 52	42 months

yyy. 42 U.S.C. § 2215(c).

zzz. 42 U.S.C. § 2215 note.

aaaa. *See* Generic Milestone Schedules of Requested Activities of the Commission, https://www.nrc.gov/about-nrc/generic-schedules.html.

Activity	Type	Generic Milestone to Issue Final Safety Evaluation
	Combined (non-LWR not referencing a certified design) – Part 52	36 months
	Manufacturing (LWR or non-LWR referencing a certified design) – Part 52	30 months
	Manufacturing (non-LWR not referencing a certified design) – Part 52	36 months
	Manufacturing (LWR not referencing a certified design) – Part 52	42 months
Permits and Authorizations	Construction Permit – Part 50	36 months
	Limited Work Authorization – Parts 50 and 52	36 months
	Early Site Permit – Part 52	24 months

Although these appear to generally be improvements over recent precedent for similar types of NRC licensing activities, this report suggests opportunities exist to substantially shorten these timeframes, perhaps by half. As one example, Table 2 shows a 30-month milestone for a COL for either an LWR or non-LWR referencing a certified design. This timeframe provides only a 6-month or a 12-month improvement, respectively, in comparison to a COL milestone for a non-LWR or LWR which does not reference a certified design. A reactor design certified by the NRC—which itself is subject to a 36- or 42-month milestone—should include approval of the vast majority of design issues. Thus, the above table indicates a certified design only provides a half year or a year improvement in the COL process. This rather marginal improvement in the timelines does not appear reasonable.

Furthermore, the above milestones do not represent the total licensing timeframe between submittal of an application until the licensing action is final. In other words, these milestones only represent the time period between acceptance, or "docketing," of an application and issuance of a final safety evaluation. That docketing typically will take a month or two, but can take many months if the NRC seeks additional information. Therefore, a risk exists that the clock for the above milestones will not start for months after an application is submitted to the NRC, and there is a risk that portions of the NRC review will drift to the docketing timeframe to ensure the NRC can meet the established milestones. Although this may help from a reporting standpoint, it does not help reduce the overall licensing timeframe for a new reactor project. This docketing risk could be prevented by limiting the time for the NRC to docket an application, adding a statutory requirement for docketing new applications, or requiring reporting to Congress if certain docketing timeframes are exceeded. The NRC also should be required to report the basis for rejecting any applications.

Additionally, the issuance of the final safety evaluation is not the same as issuance of a license. The mandatory hearing discussed in Section 2.1.1, which is required for CPs, LWAs, ESPs, and COLs, adds 4-7 months to the licensing action. Any contested hearings also may extend the licensing process for months or years. The NRC should be evaluating the real timeframes from submittal of an application until the licensing activity is complete. This type of evaluation will drive efficiencies and improvements across

the entire timeframe. Finally, the NRC should be required to revisit the milestones annually to look for improvements.

NEIMA Section 102(c) further provides reporting requirements for exceeding the above milestones. Specifically, the NRC Executive Director for Operations must inform the Commission of a delay in issuance of the final safety evaluation within 30 days after missing a milestone.[bbbb] Similarly, the Commission must submit a report to appropriate congressional committees if the milestones are exceeded by 180 days, including a detailed explanation accounting for the delay and a plan for timely completion of the final safety evaluation.[cccc] While these reports are substantial improvements over the prior practice, they also can be improved.

As noted above, focusing on the timeframes between docketing and the final safety evaluation ignores the long docketing durations and the many months which may occur between the final safety evaluation and licensing action. The reporting requirements should be revised to address docketing and the overall timeframe to reach a licensing action. They should require reports to the Commission and appropriate congressional committees of any docketing decisions exceeding two months. Additionally, the reporting requirements should be revised to inform the Commission three months before reaching a milestone. Prior notification is required for the Commission to take action not to exceed a milestone. Finally, any projects that exceed a milestone should be reported to the appropriate congressional committees immediately, not wait for half of a year.

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

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 . . . ."[dddd] Although this provision mentions the "Commission," which originally was a reference to the AEC, the courts have confirmed that Commission in this provision now must be read to include DOE.[eeee] Therefore, the default 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 ERA, Congress further recognized DOE authorization for nuclear R&D by stating that 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."[ffff]

Some exceptions exist to the above default 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.[gggg] Of most relevance here, those facilities include: "(2) Other

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bbbb. 42 U.S.C. § 2215(c)(2).

cccc. 42 U.S.C. § 2215(c)(3).

dddd. 42 U.S.C. § 2140.

eeee. *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 the [ERDA]. In 1977, Congress terminated the Energy Research and Development Administration 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.

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

gggg. 42 U.S.C. § 5842.

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 other manner for the purpose of demonstrating the suitability for commercial application of such a reactor." Therefore, if a reactor placed on a national laboratory site 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 must be NRC licensed.

Although the first part of this 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 proposed for a national laboratory 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.

The NRC addressed some of these requirements in a letter to DOE in February 2020 in response to a Request for Information on the Advanced Reactor Demonstration Program.[hhhh] The letter discussed the NRC licensing process and issues relevant to advanced reactors, including the question of DOE authorization versus NRC licensing. The NRC began by acknowledging that a reactor affiliated with DOE may or may not require an NRC license depending on the circumstances.

Consistent with the above discussion of ERA Section 202, the NRC further stated that "[a]n NRC license is also required for demonstration reactors operated as part of the power generation facilities of an electric utility system or otherwise to demonstrate the reactor's suitability or practical value for industrial or commercial application . . . ."[iiii] Thereafter, however, the NRC provided some additional interpretation of what this means: "In general, a demonstration reactor project that is subject to NRC licensing . . . is one that serves to demonstrate an entire reactor for commercial purposes, rather than demonstrating only a portion of the reactor." But this differentiation between an entire reactor and a portion of a reactor is not found in the legislative requirements discussed above.

The NRC continued by acknowledging that "DOE has statutory authority to self-regulate construction and operation of reactors on DOE property for the purpose of developing or testing new reactor technologies or concepts, or the safety and workability of systems or components individually or as part of the overall reactor system, where the project does not rise to the level of demonstrating an entire reactor for commercial suitability."[jjjj] While helpful, this threshold still relies upon undefined terms to determine whether NRC licensing is needed.

Consistent with AEA Section 110, projects constructed and operated at a national laboratory site 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 without selling power or another commercial product, unless the project is needed for an R&D purpose. The cost simply would not be

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hhhh. Letter from H. Nieh and R. Furstenau, NRC, to E. Dye, DOE, U.S. Nuclear Regulatory Commission Response to the U.S. Department of Energy, Information Request on the Advanced Reactor Demonstration Program (DE-FOA RFI-0002271) (Feb. 21, 2020), *available at* https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML20140A272.

iiii. *Id.* at 3.

jjjj. *Id.*

justified. Requiring an NRC license under these conditions would add significant cost and time not appropriate for those projects. The likely outcome is the projects will avoid national laboratory 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 they could be DOE authorized. The phrase "under contract with and for the account of" DOE should be clarified to include projects operated by a DOE M&O contractor. Alternatively, the ERA Section 202 exception could be modified to clarify that the NRC has licensing jurisdiction on DOE sites 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.

2.4. Reforms to Provide Financial Benefits to New Reactor Projects

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

The costs to new reactor applicants for NRC review fees are extremely high. The NRC is required by law to recover approximately 90% of its annual budget, which the NRC recovers through annual fees and hourly fees. A 2019 Nuclear Energy Institute white paper on microreactor regulatory issues estimated that COL reviews have cost about $30M and design certification reviews have cost about $45-90M in NRC review fees.[kkkk] The overall cost for preparing an application and supporting the NRC review of that application would be much higher. As one example, it has been reported that NuScale spent over $500M to develop the information to prepare its DCA.[llll]

Any mechanism which would provide financial support to new reactor applicants would benefit the advancement of new nuclear projects. However, any changes should ensure that the costs are not shifted to existing licensees. Here are some potential options for potentially addressing the high new reactor review costs:

- Do not require the NRC to recover costs for any new reactor application reviews.
- Section 204 of the ADVANCE Act (Enabling Preparations for the Demonstration of Advanced Nuclear Reactors on Department Sites) would exclude costs for pre-application activities and to review ESP applications to demonstrate an advanced nuclear reactor on a DOE Site. A slight modification to this approach may be beneficial. An ESP application typically would be submitted by the future owner or operator of the reactor covered by the application. However, it would be possible and very beneficial for a national laboratory to submit an ESP application for potential new reactor projects on a national laboratory site to prepare and approve new reactor locations on the site before a specific owner/operator is identified. The application could utilize a "Plant Parameter Envelope" (similar to past ESP applications) to bound a hypothetical future reactor or reactors. Once DOE approves an appropriate owner/operator for a reactor on a site, the national laboratory could transfer the ESP to that company. This would potentially save years of effort by the owner/operator to site and construct the reactor. Funding for preparing such ESP applications would be beneficial.
- ADVANCE Act Section 201 supports fees for certain advanced reactor application review activities.

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kkkk. Micro-Reactor Regulatory Issues, at A-1 to A-2 (Nov. 13, 2019), *available at* https://www.nrc.gov/docs/ML1931/ML19319C497.pdf.

llll. NuScale SMR Receives US Design Certification Approval (Sept. 1, 2020), https://world-nuclear-news.org/Articles/NuScale-SMR-receives-US-design-certification-appro.

- ADVANCE Act Section 202 provides prizes for advanced nuclear reactor licensing, which could be expanded to address more projects.
- NRC should not collect any fees for pre-application activities with potential new reactor applicants, allowing education on the reactor technology and NRC licensing process. These pre-application activities would include public meetings, but also discussions directly between the applicant and the NRC Staff.
- NRC should provide a fixed application review cost based on the type of application and the size and type of reactor, providing cost certainty to new reactor applicants. This fixed review cost also could be based on an agreed upon, detailed engagement plan between the NRC and the applicant.
- NRC could provide a sliding scale for application fees, which would be reduced after a base amount is passed.
- NRC could provide a payback strategy based on a reactor subject to an application review entering operation.
- Congress could directly appropriate funds to cover the licensing costs associated with projects that it encourages for the national good, such as advanced reactor demonstration projects that are fully or partially funded by appropriations to DOE, including the two Advanced Reactor Demonstration Program (ARDP) demonstration projects.

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.

AEA Sections 103d and 104d prohibit issuance of a license "if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government."[mmmm] This prohibition has prevented or significantly affected new reactor projects. For example, the Calvert Cliffs Unit 3 COL was stopped due to indirect French foreign ownership.[nnnn] Another project, STP Units 3 & 4 COL, had to fight this issue in a contested hearing due to partial indirect Japanese foreign ownership.[oooo]

Section 301 (Investment by Allies) of the ADVANCE Act identifies long overdue changes to the Foreign Ownership, Control, or Domination (FOCD) requirements if the Commission determines the entity is not inimical to (1) the common defense and security, or (2) the health and safety of the public. These changes should be pursued. Little risk exists from foreign ownership of nuclear projects by allies to the United States, and the Section 301 approach would still require a review by the NRC. These changes also could result in positive additional investment in U.S. nuclear projects.

The list of countries in Section 301 subject to the change, however, is quite narrow. It applies to a member of the Group of Seven as of November 25, 2020 (i.e., United Kingdom, Germany, Canada, Japan, France, and Italy), or the Republic of Korea. The list excludes many U.S. allies. The list should be broadened or flipped to identify the countries excluded. Alternatively, the list could be deleted entirely and rely upon the NRC's required inimicality review and finding.

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mmmm. 42 U.S.C. §§ 2133(d), 2134(d); *see also* 10 C.F.R. § 50.38.

nnnn. *See, e.g.*, Capital Gazette, ASLB Terminates Foreign-Ownership Proceeding for Calvert Cliffs Reactor, https://www.capitalgazette.com/cg2-arc-8fe5cfcf-4df7-53b0-8eef-394ea958bb57-20121103-story.html.

oooo. *See Nuclear Innovation North America LLC* (South Texas Project Units 3 & 4), LBP-14-3, 79 NRC 267 (2014).

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

The Price-Anderson Act (PAA) amended the AEA in 1957 to establish a system of financial protection for those who are either liable for or injured by a nuclear incident.[pppp] The purpose of the PAA was to both protect the public and to encourage the development of the atomic energy industry. DOE and the NRC administer their respective obligations under the PAA. The financial protections primarily apply to DOE contractors undertaking activities involving the risk of a nuclear incident and to specified NRC licensees, including those holding licenses for new reactors. The primary PAA provisions are found in AEA Section 170 with indemnification authority for NRC licensees found in Section 170c. and indemnification authority for DOE contractors found in Section 170d.[qqqq] The PAA has been amended multiple times and has extended the PAA authority until December 31, 2025.[rrrr]

Given the upcoming deadline for PAA authority, and as required by AEA Section 170p, both the NRC and DOE have submitted reports to Congress regarding the need for continuation of PAA authority after December 31, 2025.[ssss] The NRC recommended that Congress continue the PAA "because the Act provides a valuable public benefit by establishing a system for the prompt and equitable resolution of public liability claims resulting from a nuclear incident."[tttt] In describing its conclusions following review of the PAA, the NRC provided the following favorable description:

> Protection of the public has been a principal purpose of the Price-Anderson Act, along with removing barriers to the nuclear energy option as a private commercial endeavor. The statutory scheme of government indemnification and/or private insurance has been intended to assure the availability to the public of adequate funds in the event of a nuclear incident. Other benefits to the public include such features as emergency assistance payments, consolidation and prioritization of claims in one court, channeling of liability through the "omnibus" feature, and waiver of certain defenses in the event of a large accident. The system has removed the deterrent to private sector participation in nuclear power programs by reducing the probability of financial catastrophe for industry participants due to liability resulting from a nuclear accident. The structured payment system of billions of dollars created to meet the two objectives stated in the Price-Anderson Act has assured that significant funds are available to the public to satisfy claims if a nuclear event were to occur, enabled private sector participation in atomic energy, and operated for over 60 years with minimal cost to the taxpayer.[uuuu]

Similarly, DOE's report indicated that it fully supports continuation of PAA coverage. It stated:

> The Department strongly believes that continuation of the PAA and the DOE indemnification without substantial modification is vitally important to the achievement of DOE's statutory missions, protection of the public and injured persons in the event of a nuclear incident, and promotion of American leadership

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pppp. *See* Pub. Law 85-256, 71 Stat. 576 (Sept. 2, 1957).

qqqq. *See* 42 U.S.C. §§ 2210(c), (d).

rrrr. *Id.*

ssss. NUREG/CR-7293, The Price-Anderson Act: 2021 Report to Congress, Public Liability Insurance and Indemnity Requirements for an Evolving Commercial Nuclear Industry (Dec. 2021), *available at* https://www.nrc.gov/docs/ML2133/ML21335A064.pdf ("NRC 2021 PAA Report"); Price-Anderson Act Report to Congress (Jan. 2023), *available at* https://www.energy.gov/sites/default/files/2023-02/PAA%20Report%20January%202023_0.pdf ("DOE 2023 PAA Report").

tttt. NRC 2021 PAA Report at 4-2.

uuuu. *Id.* at 4-1.

> and a strong domestic industry in nuclear exports with continuation of the PAA in a manner compliant with the [Convention on Supplementary Compensation for Nuclear Damage].[vvvv]

These many reasons support amending the AEA to extend the PAA coverage past the upcoming 2025 deadline.

The support raises the question about the length of the extension of the PAA coverage. Based on the favorable experience with the PAA over the past 65 years of coverage with many decades of reactor operating experience, there is no reason to place a deadline on the PAA coverage. Furthermore, there is no apparent reason for expecting the needs and benefits associated with the PAA to change in the future, and therefore no reason to have to revisit the PAA in the future on a defined schedule. This continuous renewal process creates uncertainty over the applicability of the PAA coverage for the nuclear industry, which is particularly significant for projects that can last for many decades. It also creates additional administrative burden for Congress, the NRC, and DOE. For these reasons, the AEA should be revised to remove any timelines related to its applicability.[wwww] If any circumstances change in the future, then Congress can revisit the PAA requirements, similar to other laws. Section 302 of the ADVANCE Act would extend the PAA by 20 years, until December 31, 2045. Although definitely preferable to no extension, the extension discussed above without a specific end point would better advance the needs of the nation and NRC-licensed advanced reactors.

Finally, in addition to PAA extension, DOE made two key recommendations which would expand coverage outside the United States. First, DOE stated that it "supports expanding the DOE indemnification to cover contractual activity that is for or on behalf of DOE outside the United States, without the condition that the nuclear materials involved in the activity must be owned by the United States."[xxxx] Second, DOE recommended increasing the amount of that indemnification from $500M to $2B.[yyyy] Although these changes would most directly impact DOE contractors, those contractors are often NRC licensees and may be undertaking activities related to advanced reactors. These recommendations from DOE appear reasonable and may benefit those NRC licensees.

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vvvv. DOE 2023 PAA Report at 30.

wwww. Although DOE did not provide a specific recommendation on the length of extending PAA coverage, the NRC recommended a 10-year extension "to allow Congress to be better able to consider substantial changes related to trends in decommissioning and in advanced reactor technologies that are anticipated to continue within the nuclear power industry." NRC 2021 PAA Report at 4-2. However, there is no apparent reason that technology advancements would have any effect on the need for the protections to the public and industry provided by the PAA, especially within the next 10 years. If anything, the developing technologies with smaller and newer companies will need those protections even more.

xxxx. DOE 2023 PAA Report at 27.

yyyy. *Id.* at 27-28.

NUCLEAR ENERGY INSTITUTE

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May 4, 2023

The Honorable Cathy McMorris Rodgers
Chair
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20510

The Honorable Jeff Duncan
Chair
Subcommittee on Energy, Climate, and Grid Security
Washington, D.C. 20515

The Honorable Frank Pallone, Jr.
Ranking Member
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20510

The Honorable Diana DeGette
Ranking Member
Subcommittee on Energy, Climate, and Grid Security
Washington, D.C. 20515

Dear Chair Rodgers, Chair Duncan, Ranking Member Pallone and Ranking Member DeGette,

On behalf of the nuclear industry, NEI[1] appreciates your efforts to ensure that the regulation of the commercial nuclear power industry is consistent with the Atomic Energy Act and the Nuclear Regulatory Commission's (NRC) own Principles of Good Regulation. This is an important time for the nuclear industry, as it is being called on to play an increasingly critical role in meeting the nation's carbon reduction and energy security goals and prepares for the long-term operation of its existing plants and construction of new, advanced plants. For the nuclear industry to fulfil this mission, the NRC must aggressively modernize itself to improve the efficiency, timeliness, and predictability of its licensing and oversight processes significantly.

Current State

The U.S. nuclear fleet is performing at unprecedented levels of safety and reliability.[2] Advances in nuclear technology offer new opportunities to improve upon this outstanding performance and will enable nuclear energy to better support a reliable and affordable clean energy transition. Nuclear power is the safest, most reliable form of electricity production.[3] As the Department of Energy (DOE) recently reported,[4] advanced nuclear energy's value proposition lies in its generation of carbon-free electricity,

[1] The Nuclear Energy Institute (NEI) is responsible for establishing unified policy on behalf of its members relating to matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect and engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations involved in the nuclear energy industry.

[2] NEI 20-04, "The Nexus Between Safety and Operational Performance in the U.S. Nuclear Industry," March 2020; Nuclear by the Numbers Fact Sheet, August 2020.
[3] Department of Energy – "Nuclear Power Most Reliable Energy Source and its not even close"
World Nuclear Association – Safety of Nuclear Power Reactors
OurWorldinData.org – Safest Sources of Energy
[4] U.S. Department of Energy, "Pathways to Commercial Liftoff: Advanced Nuclear," March 2023

ability to provide firm power that complements other sources, low land-use requirements, and low transmission requirements relative to distributed sources. It also offers appreciable regional economic benefits, can aid in an equitable transition to a net-zero grid, and has a wide variety of use cases that enable grid flexibility and decarbonization beyond the grid. By the DOE's estimates, the U.S. could triple the amount of nuclear power utilized by 2050 and reestablish itself as the world leader in nuclear energy, supporting our national security goals and the energy security goals of countries around the world.

The road to meeting this opportunity runs directly through the NRC, an agency that has spent the last 40 years focused predominantly on the safety of the operating fleet of large light water reactors. Unfortunately, because of the relatively static nature of the industry during that time, the NRC's processes have become cumbersome and do not consider the important metric of efficiency. Too often, the NRC diverts its time and attention into activities that have a negligible effect on safety. As the industry reaches an inflection point at which demand grows and new technologies move from design to deployment, the NRC must modernize and become an efficient safety regulator so that it is not an impediment to letting commercial nuclear power play a key role in meeting the nation's goals. The NRC must streamline its processes to support the expanded production of power from the current fleet and make possible the timely deployment of simpler and inherently safer advanced technologies. The NRC can accomplish this without compromising its strength or independence.

NRC Mission

In enacting the Atomic Energy Act of 1954, as amended (the Act or AEA), Congress declared it to be "the policy of the United States that . . . the development, use, and control of atomic energy shall be directed so as to make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security."[5] Although Congress later separated the Atomic Energy Commission's regulatory and promotional functions,[6] that separation did not change the overall U.S. policy with respect to the use of atomic energy. Today, however, the NRC's mission focuses solely on the safety and security of nuclear plants and omits the need to maximize the contribution to the general welfare. This omission has fostered the development of unnecessarily burdensome regulatory practices. Consequently, having for decades been siloed off from this policy, NRC processes, culture, and values have developed in a manner that does not fulfil the fundamental Congressional policy set forth in the AEA. Now, at a time when nuclear power is essential to national security, electricity reliability, electricity affordability, and our nation's goals for a clean energy economy, it is essential that Congress reinforce these original intentions of the Act. Enclosure 1 of this letter provides more details on how this can be achieved.

Opportunities for Change

The NRC's mandate under the AEA does not stand in the way of evolution. Rather, the AEA has provided enduring deference allowing the agency to evolve and adapt the regulatory framework alongside advancements in science and technology. The NRC's statutory mandate is to provide reasonable assurance of adequate protection while maximizing the contribution to the general welfare.

[5] Atomic Energy Act of 1954, as amended (P.L. 83-703), at §. 1.a, 42 U.S.C. § 2011(a) (emphasis added).
[6] *See* Energy Reorganization Act of 1974, as amended (P.L. 93-438).

Unfortunately, the NRC's regulatory modus operandi has evolved from providing reasonable assurance of adequate protection to, practically speaking, providing absolute protection. As the NRC has itself acknowledged time and time again, reasonable assurance is not absolute assurance or zero risk. Nevertheless, there are numerous examples where the NRC's day-to-day regulatory actions and decision making reflect an absolute assurance/zero risk mentality. The NRC's focus must shift back to the core mandate of reasonable assurance of adequate protection, and many existing NRC policies and practices could benefit from revision.

Recently, the NRC staff have begun revisiting long-standing operating plant practices requiring new licensee actions for issues with no clear safety significance. These unnecessary changes cannot be justified on the basis of safety and undo decades of accepted practice that has supported the industry's high safety and reliability performance. These practices are not consistent with the philosophy of the AEA, are inconsistent with the Backfit Rule (10 CFR 50.109) and raise questions as to the NRC's preparedness for regulating new technologies.

Enclosure 2 offers a slate of legislative recommendations for driving toward more efficient, flexible, and predictable licensing, permitting and oversight processes and decisions, while continuing to ensure that public health, safety, security, and environmental protection are not compromised. These recommended legislative actions are in line with NRC's own Principles of Good Regulation and focus on implementing the clarified mission for the NRC, eliminating redundant or unnecessary processes, and setting accelerated timelines for NRC actions in the licensing activities that would be most impactful.

Although the NRC has taken some positive steps, more aggressive action is needed to support key licensing activities for the operating nuclear fleet and the projected scale of advanced reactor deployment. The NRC must increase its focus on developing and implementing modernized regulatory processes that are timely and right-sized for the long-term operation of existing nuclear plants, and the next generation of advanced reactor designs. As the trade association for the industry, NEI and its members stand ready to support these critical efforts to advance the safe use of nuclear energy.

Thank you for your consideration.

Yours very sincerely,

Maria Korsnick

Maria Korsnick

Enclosure 1
AEA Basis for Refocusing the NRC's Mission

The NRC should view and implement its mission through the lens of the broader context of the U.S. policy, which establishes that nuclear energy should make the "maximum contribution to the general welfare." To be clear, the NRC's decision making on specific issues related to the operation of nuclear power reactors should continue to ensure that "utilization or production of special nuclear material will be in accord with the common defense and security and will provide adequate protection to the health and safety of the public."[7] The Atomic Energy Act of 1954, as amended (the Act or AEA) is clearly focused on protecting the public from radiological hazards associated with production and utilization of special nuclear material.[8] That said, it is also well-established that the Commission's discretion in the how it regulates radiological safety is so "broad" and "free of close prescription" that it is "virtually unique."[9] The NRC must remain focused on radiological safety. However, this does not mean that the agency has license to overlook how inefficiencies in its regulatory processes adversely impact the general welfare. At this critical stage in the country's push to meet climate and energy security goals, it is essential that the NRC establish goals that reflect an understanding of the broader policy context within which the agency has been given regulatory authority. Specifically, we encourage the NRC to redouble its efforts to ensure that it operates as a modern, risk-informed regulator and executes its radiological safety and security mission in the most effective, efficient, predictable, and least burdensome manner possible. This will ensure that in executing its safety mission, the NRC removes current unnecessary burden, and does not inadvertently erect new barriers to achieving the broader policy objectives of the AEA and more recent legislation[10] – particularly given nuclear power's vital role in addressing the climate crisis.

In enacting the Atomic Energy Act of 1954, as amended, Congress declared it to be "the policy of the United States that . . . the development, use, and control of atomic energy shall be directed so as to make the *maximum contribution to the general welfare*, subject at all times to the paramount objective of making the maximum contribution to the common defense and security."[11] Although Congress later separated the Atomic Energy Commission's (AEC's) regulatory and promotional functions,[12] that separation did not change the overall U.S. policy with respect to use of atomic energy.

Congress also found that "[t]he development, utilization, and control of atomic energy for military and for all other purposes are vital to the common defense and security."[13] At the same time, Congress recognized that "regulation . . . of the production and utilization of atomic energy . . . is necessary"[14] in the national interest to assure the common defense and security and to protect the health and safety of the public.[15] Thus, from the beginning, the Act's primary purpose has been to establish a program for the safe, secure, and widespread use of atomic energy to maximize the contribution to the national

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[7] Atomic Energy Act of 1954, §. 182a.; *See also Union of Concerned Scientists v. NRC*, 824 F.2d 108 (DC Cir. 1987).
[8] *See New Hampshire v. AEC*, 406 F.2d 170, 14-75 (1st Cir. 1969)
[9] *Siegel v. AEC*, 400 F.2d 778 (D.C. Cir. 1968).
[10] See, e.g., "Nuclear Energy Innovation and Modernization Act," Pub. L. 115-439, at Sec. 103 "Advanced Nuclear Reactor Program" (Jan. 14, 2019) (directing the NRC to establish a risk-informed, technology-inclusive framework to license and oversee advanced nuclear technologies).
[11] Atomic Energy Act of 1954, as amended (P.L. 83-703), at §. 1.a, 42 U.S.C. § 2011(a) (emphasis added).
[12] See Energy Reorganization Act of 1974, as amended (P.L. 93-438).
[13] Id. at §. 1.b.
[14] Id. at §. 1.b.
[15] Id. at §. 2.e

welfare.[16] Given the threat posed by climate change, meeting this objective is more urgent now than ever before.

In short, the NRC must refocus its mission and workforce on modernized regulatory processes that are efficient, timely and right-sized as it prepares for the long-term operation of existing plants and the next generation of simpler and inherently safer designs.

[16] Id. at §. 3.c, d (purposes of the Act include providing for a program "to make the maximum contribution to the common defense and security and the national welfare" and "to encourage widespread participation in the development and utilization of atomic energy for peaceful purposes to the maximum extent consistent with the common defense and security and with the health and safety of the public")

Enclosure 2
Legislative Recommendations to Drive Increased Efficiency of NRC Processes and Decision Making

We offer the following recommendations for achieving more efficient, flexible, and predictable licensing and oversight of today's operating reactors, as well as improved processes for the siting, licensing, construction, and oversight of advanced nuclear reactor technologies. We believe these recommendations achieve these goals while also continuing to ensure that public health, safety, security, and environmental protection are not compromised.

NRC Mission

1. Direct NRC to modify the agency's mission.

- Direct the NRC to modify or reformulate the agency's mission, and formal mission statement, to accurately reflect the intent of Congress, as described in the Atomic Energy Act, to expressly include nuclear energy's role in contributing to the maximum benefit of society.
- The NRC mission should address the two primary functions of the agency: 1) provide reasonable assurance of adequate protection of the public health and safety and the common defense and security, and 2) ensure that the regulation of nuclear activities is efficient and does not unnecessarily limit the potential of nuclear technology to maximize its contribution to the benefit of society.
- Direct the NRC to submit to Congress a report, within 90 days, that describes the plan to adopt the revised the agency mission, including plans for training of leadership, staff and new employees to ensure they all understand their part in maximizing the contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security.

Operating Plants

2. Require more efficient application reviews for license renewal and power uprate applications.

- Require the NRC to establish review schedules for power reactor license transfer, initial license renewal, subsequent license renewal, and power uprate amendment applications as identified below.
    - License transfer – Complete review within 6 months of docketing
    - Initial license renewal – Complete review within 12 months of docketing
    - Subsequent license renewal – Complete review within 12 months of docketing

- Measurement Uncertainty Recapture (MUR) power uprate – Complete review within 6 months of docketing
- Stretch power uprate – Complete review within 9 months of docketing
- Extended power uprate – Complete review within 12 months of docketing

- Resource reductions for these reviews should target the level of efficiency met by the top quartile of historical reviews. For subsequent license renewal, review resource reductions should target the level of efficiency met by the top quartile of historical reviews for initial license renewals.
- Require that the Commission provide a periodic report to Congress on license application reviews that demonstrates the improvements being achieved.

3. Direct the NRC to ensure an overarching focus in its regulatory programs on what is most important to safety.

- Require that the NRC periodically re-train its staff and leaders on its decision making processes, including the agency's backfitting regulations in 10 CFR 50.109 and associated NRC guidance, and the application of NRC's reasonable assurance of adequate protection standard.
- Require that the NRC expand the use of qualitative risk insights into areas that have been traditionally approached deterministically, including security, emergency preparedness and aging management.
- Require that the NRC implement a more streamlined license amendment review process for matters of low safety significance using either quantitative or qualitative risk insights.
- Require that the NRC implement a more streamlined topical report review process, including improved timeliness metrics and an appeal process.
- Require that the NRC conduct an evaluation of the measures that can be taken to improve the efficiency, timeliness, and safety focus of the Advisory Committee on Reactor Safeguards (ACRS).
- Require that the NRC expeditiously complete its rulemaking effort to modernize nonemergency reporting requirements, which is currently anticipated to last eight years despite a sound regulatory basis that was developed by the NRC staff.
- Require that the Commission provide a report to Congress on new activities undertaken to modernize its regulatory programs.

4. Direct the NRC to evaluate measures to improve efficiency of its oversight programs.

- Require that the NRC conduct an evaluation of measures that can be taken to improve the efficiency of its oversight programs. This evaluation should include organizational changes such as reducing the number of NRC regional offices and their reporting structure, improvements in guidance and training, increased use of templates in documenting inspection results, and identification and elimination of areas of duplication or otherwise unnecessary inspection.

5. Direct the NRC to improve the disposition of differing professional opinions.

- The NRC's differing professional opinion processes are important to ensuring that agency leadership has a broad perspective to support decision making. However, the current processes hamstring NRC leadership's decision making ability and do not expressly include safety thresholds. Require that the NRC streamline its process for resolving differing views such that a safety threshold must be met to enter the process, and issue resolution must not impact the project schedule.

New Plants

6. Direct the NRC to facilitate the deployment of advanced reactors to the maximum extent possible.

- Direct the NRC to establish a policy for "Appropriate Regulation of Advanced Reactors," consistent with the hazard, that seeks to eliminate requirements and practices that result in unnecessary regulation.
- Direct the NRC to pursue organizational enhancements that enable timely and efficient regulation of advanced reactors.

7. Direct the NRC to streamline application reviews for new reactor license applications.

- Establish the following generic milestones for construction permit, operating license, early site permit, design certification, and combined license applications. These generic milestones are targets that are expected to be met for the large majority of applications, but may be exceeded in extraordinary cases.
  - Issuance of any draft environmental impact statement (EIS) no later than 12 months after the application is docketed,
  - Issuance of any safety evaluation report and final EIS or environmental assessment (EA) no later than 18 months after the application is docketed,

  - Issuance of a decision on the requested permit, license, or certification no later than 24 months after the application is docketed.

- Require NRC staff and each applicant to agree on application-specific milestones, which may be shorter or longer than the generic milestones, and which can be modified with the consent of both parties.
- Establish a streamlined review process, with accelerated generic milestones, for NRC licensing actions to allow repetitive deployments of a standard design, at multiple levels.
- Require that the Commission report to Congress if any application-specific milestones are not met and describe the reason for the delay and the NRC's plan for timely completion of the applicable action.
- Require that the Commission report to Congress with recommendations to further facilitate expedited licensing and environmental reviews for new reactors.
- Require that the Commission provide a periodic report to Congress on new plant application reviews that describes the agency's progress toward meeting licensing goals.

8. Require the development of an appeal process for timely resolution of new plant licensing issues.

- Require the appeals process be designed to minimize the NRC resources spent on staff concerns that do not have a regulatory basis or are of low safety significance to accelerate agency decision making.

9. Provide an efficient timeline for application reviews by the Advisory Committee on Reactor Safeguards (ACRS).

- Require the ACRS to begin its review of a referred application within one month of receiving the application and submit its report on the application to the Commission no later than 6 months after initiating its reviews.
- Clarify that ACRS's independent review of the NRC staff's work need not essentially duplicate the staff's review scope and depth, nor intrude upon the staff's day-to-day performance of their review. Thus, the ACRS review should focus only on unique and safety significant aspects of the design to ensure that all factors were considered in the design and safety review.

10. Allow an applicant's environmental report to serve as a draft Environmental Impact Statement (EIS).

- Instead of the NRC staff re-writing the applicant's detailed environmental report, authorize the use of the report as the draft EIS, consistent with current CEQ regulations (40 CFR 1506.5).

11. Direct the NRC to begin any contested hearing on environmental contentions upon issuance of the draft EIS.

- Rather than delay contested hearings until the NRC staff issues the final EIS, require the NRC hold its environmental hearings upon issuance of the draft EIS, unless it determined that doing so will adversely impact the staff's ability to complete its final EIS in a timely manner.

12. Direct the NRC to use informal adjudicatory procedures (as opposed to trial-type evidentiary hearings) unless the Commission determines that formal procedures are needed to develop a sufficient record or to achieve fairness.

- In conjunction with clarifying that the NRC may use informal procedures, direct the agency to use legislative hearings (i.e., paper only hearings) in licensing proceedings and consider additional changes to its hearing procedures to streamline the adjudicatory process.
- Align discovery obligations with Federal Rule of Civil Procedure 26 such that applicants and intervenors must produce documents that support their positions rather than the currently overly broad directive to produce all "relevant" documents.

13. Authorize the NRC to issue and make immediately effective new reactor licenses and permits when there is a pending request for a hearing.

- Establish that notwithstanding an outstanding hearing request, the NRC may issue and make immediately effective a construction permit, operating license, early site permit, or combined license once the Commission has found that the application satisfies relevant statutory and regulatory requirements.

14. Eliminate the uncontested "mandatory" hearing for construction permit, early site permit, and combined license applications.

- Removing this artifact of early licensing proceedings would not affect the public's right to request a hearing and would not change the need for the NRC staff to conduct sufficient safety and environmental reviews under the AEA and NEPA and to conclude those reviews before issuing a license or permit.

15. Authorize the use of streamlined environmental documentation in any proceeding referencing an early site permit.

- Direct that the NRC use a supplemental EIS or Environmental Assessment (EA) in any construction permit or combined license proceeding referencing an early site permit.
- Require incorporation by reference of information from the EIS for the early site permit and the inclusion of additional information only if necessary to address new and significant information that materially changes prior findings or conclusions.

16. Direct the NRC to amend its Part 51 regulations to make them more technology-inclusive to support environmental reviews of advanced reactors and fuel cycle facilities.

- Direct the NRC to amend 10 CFR 51.20(b) to allow the staff to determine on a case-specific basis whether an EA (rather than an EIS or EIS supplement) is appropriate for a particular advanced reactor or fuel cycle facility licensing proceeding, including in those proceedings in which the NRC relies upon its proposed advanced reactor generic EIS (GEIS).
- Direct the NRC to consider the possible expanded use of categorical exclusions, including mitigated categorical exclusions, categorical exclusions of other agencies, and new categorical exclusions that could be applied to advanced reactor and fuel cycle facility licensing actions.

17. Facilitate the use of previously approved information in new reactor license applications for sites that already have an existing nuclear facility.

- Require that in any proceeding for a new reactor that would be located at the site of an existing reactor, NRC must rely upon information that was part of its decision to issue the license for the existing reactor.

NUCLEAR INNOVATION ALLIANCE

May 5, 2023

The Honorable Cathy McMorris Rodgers
Chair
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Jeff Duncan
Chair
Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Frank Pallone, Jr.
Ranking Member
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U.S. House of Representatives
Washington, D.C. 20515

The Honorable Diana DeGette
Ranking Member
Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, D.C. 20515

Dear Chair Rodgers, Ranking Member Pallone, Subcommittee Chair Duncan, and Subcommittee Ranking Member DeGette,

The Nuclear Innovation Alliance (NIA) appreciates the opportunity to respond to the U.S. House of Representatives Committee on Energy and Commerce request for information on improving the licensing review, approval, and oversight process for the U.S. Nuclear Regulatory Commission (NRC). The Subcommittee on Energy, Climate, and Grid Security specifically requested information and recommendations on topics including:

- siting, licensing, construction, and oversight of advanced nuclear technology,
- NRC licensing efficiency,
- management of regulatory costs and fees, and
- staff effectiveness and culture.

The NIA is has developed detailed recommendations on improving NRC licensing processes through engagement with stakeholders including advanced nuclear energy developers, utilities, non-governmental organizations (NGOs), the NRC Commission, NRC staff and management, and policymakers. This letter and attached reports and papers provide information and recommendations on many of the topics requested by the Committee. NIA believes that this information and recommendations can help support the Committee's NRC oversight activities and consideration of legislative proposals to improve NRC regulation.

NIA's top four recommendations for the Committee to improve NRC regulatory activities are:

1. Establish an independent panel to conduct a comprehensive examination of NRC's organizational effectiveness (with a focus on NRC's leadership, operations, and organizational culture) and make recommendations for improvements.

2. Require the NRC to provide regular reports to the Committee on project management and organizational communication (including relevant staff and management training activities). These reports should include qualitative and quantitative assessments of NRC staff and management performance, and surveys of applicants and licensees.
3. Require the NRC to provide regular reports to the Committee on new reactor licensing (including relevant staff preparation and training activities). These reports should include qualitative and quantitative assessments of applicant and NRC staff performance.
4. Conduct regular Committee oversight hearings that focus on cross-cutting NRC organizational performance factors including agency leadership, culture, project management, and communication.

This letter provides background on NRC licensing, NIA's identification of barriers to the efficient and effective licensing of advanced reactors, and recommendations for NRC reform, including both legislative and Congressional oversight activities that can help maximize the contribution of nuclear energy to the general welfare. Relevant NIA briefings and reports with additional discussion and recommendations are included as attachments to this letter to provide more detailed information on improving NRC operation.

We hope that the information and recommendations in this letter contribute to the Committee's ongoing work to ensure the predictable, efficient, risk-informed, and performance-based regulation of nuclear technology as a safe, clean, and reliable energy source. We thank the Committee for the opportunity to support its oversight and legislative work. Please contact me (jgreenwald@nuclearinnovationalliance.org) or Dr. Patrick White (pwhite@nuclearinnovationalliance.org) if you have any follow-up questions or requests related to this letter or any other Committee activities.

Sincerely,

Judi Greenwald
Executive Director
Nuclear Innovation Alliance

NUCLEAR INNOVATION ALLIANCE

Background and Motivation

The NRC will play a critical role in the development and deployment of advanced nuclear energy. More than a dozen advanced reactor companies are engaging with the NRC on various stages of pre-application interaction, application review, or construction oversight in 2023, with the number of applications expected to grow significantly over the course of this decade. The NRC will need to license hundreds of new reactors in the next two decades for advanced nuclear energy to make a significant contribution as a climate and energy solution in the United States. Effective NRC licensing and regulation in the next several years for the first-of-a-kind reactors and over the coming decade for subsequent deployments will be critical to the successful commercialization of advanced nuclear energy.

The NRC already values independence, openness, efficiency, clarity, and reliability as "Principles of Good Regulation." These principles must be effectively implemented to enable deployment of advanced nuclear energy at the scale and pace essential to combat climate change. The NRC prides itself as a continuously learning organization and should be intrinsically motivated to improve the NRC's capacity, capabilities, and processes as a modern regulator that can effectively license novel advanced reactor technologies.

For the purposes of this response, effective licensing is generally defined as licensing processes that are:

- mission-focused (fulfilling the NRC's stated mission to protect public health and safety, to promote the common defense and security, and to protect the environment)
- timely (providing licensing decisions on a timeline that facilitates commercial deployment),
- cost-effective (avoiding excessive taxpayer or applicant costs to resolve application questions),
- efficient (making best use of staff and applicant time),
- predictable (establishing and meeting NRC and applicant expectations for duration, cost, and requirements for both one-time and repeatable licensing processes),
- transparent (ensuring applicant and public understanding of regulatory processes and information)

Enabling effective licensing and regulation for advanced reactors would help transition the NRC into an innovative regulator that recognizes and internalizes the importance of nuclear power as a climate solution into its core regulatory mission.

Policymakers are increasingly interested in resolving any actual and perceived barriers to the effective licensing and regulation of advanced reactors using existing as well as new processes. Both federally and privately supported advanced reactor development projects have targeted reactor operation by the end of this decade, with some developers targeting deployment in the next 5 to 10 years (e.g., TerraPower, X-energy, Kairos, Oklo, NuScale, GE Hitachi, BWXT, Westinghouse, Holtec, and USNC).

Identification of Barriers to Advanced Reactor Licensing

NIA sought input from many stakeholders on their perspectives of advanced reactor licensing activities and potential barriers at the NRC. NIA has identified six specific barriers to advanced reactor licensing that relate to many of the major topic areas specified by the Committee in the information and recommendation request:

1. Challenges to hiring, training, and retaining qualified staff and management with technical and project management expertise necessary to lead licensing reviews of advanced reactors

2. Insufficient accountability for NRC staff in terms of schedule, breadth of scope, depth of review, or regulatory basis for technical and environmental reviews of advanced reactors
3. Inadequate leadership support and prioritization of innovative practices or processes for reviews, licensing, communication, and management
4. Inconsistent stakeholder understanding and trust in the licensing process and the role of different NRC committees and offices in the licensing process
5. Inconsistent project management and staff performance that can result in inefficient use of regulatory resources and applicant fees
6. Inconsistent external communication between stakeholders and the NRC as well internal communication between NRC staff and management can result in unpredictable regulatory processes or decisions

These barriers represent cross-cutting challenges to licensing and oversight activities by the NRC but are of particular interest and concern for the licensing of new advanced nuclear reactors.

Additional discussion and details are provided below for each of these six barriers:

1. *Challenges to hiring, training, and retaining qualified staff and management with technical and project management expertise necessary to lead licensing reviews of advanced reactors*

   Efficient and effective regulation requires that the NRC has the right people with the right skills in the right role at the right time to review license applications. NRC technical staff with specific areas of expertise are needed to review all aspects of the application including topics as diverse as reactor design, radiation protection, environmental impacts, and security. NRC project managers must coordinate reviews by both NRC staff and external consultants to ensure the timely completion of licensing reviews conducted both in parallel and in series. NRC senior management and the Commission must be prepared to make timely regulatory decisions on novel policy or technical issues. NIA's discussion with stakeholders revealed concern that the NRC is facing significant challenges related to staffing the licensing reviews for advanced reactors. This includes the NRC's ability to recruit, hire, train, and retain qualified staff due to external perceptions of the NRC as a workplace, competing opportunities (including more attractive pay, benefits, or remote work options) from advanced reactor developers or other employers, and routine retirement of a largely aging NRC work force. These factors may also contribute to low staff morale that limits organizational effectiveness and performance. The NRC is struggling to both maintain its current workforce and grow the agency to fill entry level, highly specialized, and management roles.

2. *Insufficient accountability for NRC staff in terms of schedule, breadth of scope, depth of review, or regulatory basis for technical and environmental reviews of advanced reactors*

   Licensing reviews by the NRC technical staff requires the staff to reach a determination of safety on all aspects of an application. While the process for performing reviews is clearly outlined in NRC guidance, the burden of proof necessary for NRC staff is much less well defined. The process relies on the training, experience, and expertise of NRC technical staff, management, and reviewers to ensure a consistent level of regulatory oversight. NIA heard repeatedly from both applicants and licensees of experiences with NRC staff who were unable or unwilling to reach a determination of safety when reviewing applications. These experiences resulted in overly lengthy or detailed reviews where it was unclear to licensees or applicants whether the NRC staff's line of questioning or duration of review was appropriate. These stakeholders felt that NRC management could not (or would not) hold NRC staff accountable for the schedule, breadth of

scope, depth of review, or regulatory basis for technical and environmental reviews. It is critical that NRC staff have the time and resources to perform adequate reviews, but licensing reviews conducted without accountability can result in ineffective and inefficient reviews that do not benefit the public.

3. *Inadequate leadership support and prioritization of innovative practices or processes for reviews, licensing, communication, and management*

   Licensing advanced reactors by the NRC will occur over a variety of time horizons. In the near term (next 5 years), the NRC will license first-of-a-kind and initial commercial deployments of advanced reactors using the existing regulatory frameworks, processes, and procedures found in 10 CFR Part 50, 10 CFR Part 52, and current NRC guidance. In the mid term (next 5 - 10 years), the NRC is expected license subsequent commercial deployments of advanced reactors using both existing regulatory frameworks and new regulatory frameworks currently under development for advanced reactors in 10 CFR Part 53. In the long term (after 10 - 15 years), the NRC may be asked to license the deployment of large numbers of standardized advanced reactors that enable us to meet clean energy goals while ensuring energy reliability, affordability, resiliency, and security.

   Each of these licensing time horizons will require the NRC to utilize different regulatory practices and processes to meet the needs of applicants and licensees and the public interest, while effectively and efficiently incorporating lessons learned from initial licensing reviews of advanced reactors. While the NRC has historically worked to incorporate lessons learned as a continuous learning organization, it is less clear that the NRC has consistently prioritized and supported the implementation of innovative practices that can produce significant improvements in the licensing process. The NRC's evolutionary versus innovative approach to licensing is exemplified by the 10 CFR Part 53 rule development process where the NRC staff has thus far been unable to produce a rule that could result in significant regulatory process improvements for advanced reactors. Consistent support and prioritization of innovative practices at all levels of NRC staff and management is critical to the development and implementation of more effective licensing processes.

4. *Inconsistent stakeholder understanding and trust in the licensing process and the role of different NRC committees and offices in the licensing process*

   Stakeholder understanding and trust in the licensing process is critical to the successful regulation of advanced nuclear energy. Applicants' and licensees' understanding and trust in the licensing process facilitates more effective engagement because they can more efficiently navigate the regulatory system and meet the expectations of the regulator. Public and other stakeholder understanding and trust in the licensing process builds confidence in the capability of the regulator to carry out their regulatory function and helps create social license for the operation of nuclear power plants. NIA's interactions with stakeholders suggest that there may be significant gaps in stakeholder understanding of the NRC for both applicants and licensees, as well as with the broader public and other stakeholder groups. For applicants and licensees, the expectations for regulatory reviews and the specific roles and responsibilities of internal NRC committees and offices such as the Advisory Committee on Reactor Safeguards (ACRS) and the Office of General Counsel (OGC) were highlighted as topics requiring additional clarification. For the public and other stakeholders, transparency on access to NRC documents and participation in public meetings and other licensing processes have been mentioned as areas for improvement.

5. *Inconsistent project management quality and staff performance that can result in inefficient usage of regulatory resources and applicant fees*

   One of the most important, yet least recognized, factors in the licensing review outcomes is the NRC project manager. NIA's discussions with stakeholders highlighted applicant concerns about the inconsistent quality of NRC project managers. The NRC project managers are the NRC staff responsible for overseeing a specific license application review. The NRC project manager is responsible for a wide range of activities including engaging with applicants on all application submittals and review processes, managing activities by NRC staff technical reviewers, coordinating NRC resource availability and allocation for reviews, ensuring vertical communication alignment with NRC management, and working to ensure overall review quality and execution. An effective NRC project manager can deftly manage these internal and external challenges and help keep licensing reviews on track. An inexperienced, inadequately trained, or insufficiently supported NRC project manager may struggle with one or more of their activities and contribute to unnecessary review delays, technical or policy conflicts, or ineffective use of limited NRC resources on activities that do not contribute to effective project completion and support overall NRC goals. NRC project managers may not be sufficiently empowered to effectively manage challenging staff or projects. Questions raised during a February 9, 2023, Commission briefing about whether project managers have the authority to enforce discipline and focus during licensing reviews went unanswered.[1]

   The NRC is unique among federal regulators with respect to its fee recovery structure that requires that a majority of the NRC budget is paid for by hourly fees charged to applicants and licensees. The current proposed professional hourly rate for FY2023 charged to applicants for NRC reviews and activities is $300 per hour[2].This hourly fee structure, combined with inconsistent project management quality and staff performance during licensing reviews, can have significant impacts on both the NRC and applicants and licensees. This fee structure results in a complicated regulator-regulated entity dynamic where the NRC staff may have no incentives (or in some cases potentially perverse incentives) to efficiently complete licensing reviews. The fee structure also creates challenges for NRC organizational planning. Since the NRC budget is paid for primarily by operating reactors, current licensees may push back against the NRC workforce investments that will only benefit future applicants and licensees. Having the overwhelming majority of its budget dependent on fees complicates longer-term NRC workforce and organizational planning, particularly for licensing activities where there is significant uncertainty related to the quantity, duration, and submission timing for NRC staff reviews.

   The NRC fee structure also has significant impacts on applicants and licensees. New reactor license applications have both high total costs and a high degree of cost variability. Table 1 lists the NRC staff's expected effort and cost for several typical licensing activities while Table 2 lists the NRC lower-, typical, and upper-bound costs for a combined operating license review for a new nuclear reactor[3]. High licensing fees can represent a significant barrier to engagement with the NRC, particularly for smaller applicants or companies early in the development process, and the large variability in the fees is a significant project risk. While the NRC has limited flexibility to provide

[1] February 9, 2023 Commission Meeting Transcript, NRC Accession Number ML23048A237, pg. 91-92. https://www.nrc.gov/docs/ML2304/ML23048A237.pdf

[2] FY 2023 Proposed Fee Rule Work Papers, NRC Accession Number ML23040A277, pg. 9. https://www.nrc.gov/docs/ML2304/ML23040A277.pdf

[3] New Reactors Business Line Fee Estimates (January 2023), NRC Accession Number ML23018A174. https://www.nrc.gov/docs/ML2301/ML23018A174.pdf

fee relief for some applicants, the current funding structure would necessitate use of standard review fees for most applicants. Finally, applicants using new regulatory processes or licensing new technologies would be unfairly burdened by the NRC fee structure. Inherent delays and inefficiency associated with any new activity would result in additional billed hours and an increase in the total licensing costs for "first movers". These additional fees effectively disincentivize regulatory or technological innovation.

Table 1. Average NRC Fees for Typical License Review Activities[4]

Licensing Activity	*Average Staff Hours*	*Average Cost ($300/staff hr)*	*Additional Average Contractor Costs*	*Total Average Cost*
Early Site Permit	29,104	$8,731,200	$2,760,000	$11,491,200
Combined Operating License	89,261	$26,778,300	$5,020,000	$31,798,300
Standard Design Certification	179,395	$53,818,500	N/A	$53,818,500

Table 2. NRC Fees Ranges for Combined Operating License Review[5]

Combined Operating License	*Average Staff Hours*	*Average Cost ($300/staff hr)*	*Additional Average Contractor Costs*	*Total Average Cost*
Lower Cost Estimate	44,269	$13,280,700	$2,760,000	$16,040,700
Average Cost Estimate	89,261	$26,778,300	$5,020,000	$31,798,300
Upper Cost Estimate	178,160	$53,448,000	$8,880,000	$62,328,000

6. *Inconsistent external communication between stakeholders and the NRC as well internal communication between NRC staff and management can result in unpredictable regulatory processes or decisions*

The success or failure of the advanced reactor licensing process largely depends on the people involved and their ability to reach consensus on technical and policy questions. Communication is key to an efficient licensing process because it enables applicants to develop license applications that facilitate staff reviews, NRC staff to reach timely resolution on questions or issues that arise during review, and NRC management and the Commission to help resolve policy questions and ensure staff accountability on review processes. More effective communication at all levels combine to create a more efficient licensing process for all advanced reactors designs.

NIA's discussions with stakeholders highlighted the importance of external communication between stakeholders and the NRC as well internal communication between NRC staff and management. Inconsistent external communication between stakeholders and the NRC can result in inefficient licensing reviews as stakeholders fail to provide the information necessary for the NRC staff to make a safety determination and NRC staff fail to provide actionable feedback on license submittals. These types of communication gaps can result in lengthy, costly, and ineffective licensing review cycles. Inconsistent internal communication between NRC staff and management can result in inconsistent, unpredictable, or changing regulatory requirements and interpretations within a single licensing review or across different licensing reviews. This

[4] Fees calculated based on New Reactors Business Line Fee Estimates (January 2023), NRC Accession Number ML23018A174. https://www.nrc.gov/docs/ML2301/ML23018A174.pdf
[5] Ibid.

variability has a significant impact on the effectiveness of NRC regulatory reviews as well as on the efficiency of the NRC review process. Inconsistent and inadequate communication can be a significant barrier to the effective licensing of advanced reactors by the NRC.

Recommendations for NRC reform through legislative and Congressional oversight activities

NIA's analysis of the identified barriers to advanced reactor licensing at the NRC focused on the development of practical solutions that could make a meaningful impact on near term, mid term, and long term reactor licensing activities. Adapting existing processes or developing new processes within the NRC's existing statutory mandate and regulatory frameworks provides the greatest likelihood of successful licensing of advanced reactors in the near term. Development of new regulatory frameworks or other major regulatory changes may create significant improvements in the mid term or long term, but their successful development and implementation will largely depend on the NRC's competence at core regulatory activities such as communication, project management, and organizational culture. Major legislative actions may provide an opportunity for transformational regulatory, organizational or process changes, but these solutions may inadvertently delay near term advanced reactor licensing processes or increase applicant uncertainty regarding project cost, timelines, and outcomes. It is important that a comprehensive set of regulatory reform recommendations are implemented to ensure that the NRC can effectively and efficiently regulate nuclear energy in the near term, mid term, and long term.

The NIA developed detailed recommendations for improving NRC licensing processes through engagement with stakeholders including advanced nuclear energy developers, utilities, non-governmental organizations (NGOs), the Commission, NRC staff and management, and policymakers. NIA's recommendation development process examined changes that could be made by different stakeholders in the licensing process, including NRC staff and management, the Commission, applicants and licensees, and Congress. This letter highlights specific actions that the Congress (and specifically this Committee) could take to help improve the NRC's operation and the licensing of advanced reactors. NIA's prior work on improving advanced reactor licensing at the NRC highlights the importance of all stakeholders in improving licensing outcomes and provides recommendations for all stakeholders, not just Congress (see listing of additional NIA licensing recommendations below).

Congress, and specifically this Committee, can play a critical role in directing NRC to prioritize and support organizational improvements, authorizing additional funding to support NRC licensing activities, and holding the NRC accountable for longer-term cultural and operational improvements through effective and productive oversight. NIA's top four recommendations for the Committee to improve NRC's licensing processes and NRC oversight of licensees are:

1. Establish an independent panel to conduct a comprehensive examination of NRC's organizational effectiveness (with a focus on NRC's leadership, operations, and organizational culture) and make recommendations for improvements.
2. Require the NRC to provide regular reports to the Committee on project management and organizational communication (including relevant staff and management training activities). These reports should include qualitative and quantitative assessments of NRC staff and management performance, and surveys of applicants and licensees.
3. Require the NRC to provide regular reports to the Committee on new reactor licensing (including relevant staff preparation and training activities). These reports should include qualitative and quantitative assessments of applicant and NRC staff performance.
4. Conduct regular Committee oversight hearings that focus on cross-cutting NRC organizational performance factors including agency leadership, culture, project management, and communication.

These four recommended solutions would address underlying organizational and cultural issues that limit NRC's effectiveness and efficiency as a regulator and are the root causes of many of the observed barriers to advanced reactor licensing. Additional discussion and details are provided below for each of these four recommended solutions.

1. *Establish an independent panel to conduct a comprehensive examination of NRC's organizational effectiveness (with a focus on NRC's leadership, operations, and organizational culture) and make recommendations for improvements.*

   Nearly all barriers to advanced reactor licensing at the NRC can be tied back to organizational performance. Barriers such as staffing challenges, insufficient review accountability, inadequate prioritization of innovation, and inconsistent staff performance can all be linked to agency leadership, organizational culture, and other organizational challenges that limit NRC effectiveness.

   Congress should establish an independent panel to examine NRC's organizational effectiveness, leadership, operations, and agency culture, including the functional relationship between NRC's Office of General Counsel (OGC) and its client (the Commission and NRC staff), how that relationship affects regulatory decision-making, and the effectiveness of OGC in providing legal services and advice to staff and senior leadership (including the Commission) in carrying out their responsibilities.

   Panel members should include a diverse range of experts external to the NRC, including individuals with demonstrated success in leading large organizations of around 3,000 employees, professional experience in or relating to commercial nuclear energy generation, expert knowledge of applicable law and legal policy, and expertise in Government administration. The Panel should retain a third-party management consultant to assist them in evaluating the NRC's leadership and organizational culture issues. This Panel would provide an independent assessment of NRC practices and offer specific recommendations that could help improve NRC operational effectiveness and efficiency. Improvements to organizational culture could also have significant benefits for the hiring, training, and retention of NRC staff and management.

   External independent reviews have been previously used by the NRC to evaluate performance and recommend organizational and operational changes. One specific example is the 1994 Towers Perrin report ("Nuclear Regulatory Review Study"), which uncovered "chronic and persistent problems with the NRC's management of the regulatory process", traced those problems to "weak senior management oversight", and concluded that NRC's senior leadership was not sufficiently responsive to prior independent investigations and calls for regulatory reforms.[6] These direct and impactful findings helped spur the NRC to prioritize significant internal reform activities in the 1990s to improve regulatory effectiveness.

[6] Towers Perrins "Nuclear Regulatory Review Study" Final Report, Executive Summary, October 1994.

2. *Require the NRC to provide regular reports to the Committee on project management and organizational communication (including relevant staff and management training activities). These reports should include qualitative and quantitative assessments of NRC staff and management performance, and surveys of applicants and licensees.*

   High quality project management and organizational communication are critical to any activity but are particularly important to ensuring effective and efficient licensing reviews at the NRC. To be effective, NRC project managers must be empowered to hold NRC staff and other NRC management accountable for conducting focused, disciplined licensing reviews, and they must be empowered to keep both applicants and NRC staff aligned on critical-path review activities. When combined with effective internal and external organizational communication, high quality project management keeps all stakeholders aligned and increases the predictability of the licensing review process. This also further reduces the licensing costs by ensuring more efficient allocation of NRC resources.

   Congress should require that the NRC provide regular reports on project management and organizational communication to the Committee. This reporting requirement helps emphasize the importance of project management and organizational communication and enables Congress to hold NRC accountable for operational and organizational changes that will improve reactor licensing. Specific requirements on qualitative and quantitative assessment of NRC staff and management performance, and surveys of applicants and licensees help provide clear insights to Congress on the NRC performance and areas for additional improvement.

3. *Require the NRC to provide regular reports to the Committee on new reactor licensing (including relevant staff preparation and training activities). These reports should include qualitative and quantitative assessments of applicant and NRC staff performance.*

   The outcomes of NRC licensing reviews are the product of many factors. Improving new reactor licensing requires a clear understanding of the actual challenges encountered during licensing reviews. A clear assessment of the need for organizational, regulatory, process, procedural, or administrative changes is foundational to creating more effective regulatory frameworks and review processes at the NRC. This includes both the performance of NRC staff as well as the performance of applicants to meet submission deadlines and other regulatory milestones. Effective and efficient regulatory processes require high quality and timely licensing submissions and reviews.

   Congress should require that the NRC provide regular reports on new reactor licensing to the Committee. This reporting requirement should include details related to relevant staff preparation and training activities to help Congress understand funding required to support the development of advanced reactor regulatory frameworks. This reporting requirement helps emphasize the importance of effective licensing and enables Congress to hold NRC accountable for operational and organizational changes that will improve reactor licensing. Specific requirements on qualitative and quantitative assessment of NRC staff and applicant performance help provide clear insights to Congress on the internal and external factors affecting licensing reviews and areas for additional improvement.

4. *Conduct regular Committee oversight hearings that focus on cross-cutting NRC organizational performance factors including agency leadership, culture, project management, and communication.*

   The first three recommendations to the Committee focus on encouraging the NRC to review and identify underlying organization and cultural issues that limit the NRC's effectiveness and efficiency as a regulator and are the root causes of many of the observed barriers to advanced reactor licensing. These recommendations alone, however, will not help ensure effective and efficient licensing if the NRC is unable or unwilling to act on the recommendations arising from these reports and studies. Ultimately, Congress and this Committee have the responsibility to hold NRC accountable and ensure that the NRC has the direction and resources to effectively carry out its reactor licensing and oversight activities.

   This Committee should conduct more regular oversight hearings that focus on cross-cutting NRC organizational performance factors including agency leadership, culture, project management, and communication. The goal of these hearings is to evaluate the NRC's progress in implementing organizational and cultural changes critical to improving operational effectiveness and efficiency and hold the Commission and senior management accountable for making necessary changes. The NRC must retain its independence as a regulatory organization, but the Committee is well positioned to ensure that NRC leadership is making necessary changes to effectively fulfill its mission and maximize the contribution of nuclear energy to the general welfare.

   These oversight hearings should include testimony from the Commission, NRC senior leadership, advanced reactor developers, NGOs, and any other stakeholders who can provide insight on challenges faced by the NRC in implementing effective regulatory processes or on the NRC's activities to increase the effectiveness and efficiency of advanced reactor licensing reviews.

This letter highlights that there are many challenges to advanced reactor licensing that can be addressed by NRC management, the Commission, and Congress. Congress can play a critical role in reducing or eliminating challenges to the effective licensing and regulation of advanced reactors. Congressional funding for advanced reactor licensing programs and additional authorizations can provide the NRC the resources and tools it needs to accelerate advanced reactor licensing. Congressional oversight will also be invaluable to holding the Commission and senior management accountable for improvements to licensing processes. In other cases, additional Congressional legislative direction may be an effective method to prompt and guide agency changes.

An on-going dialogue among NRC, Congress, industry, and other stakeholders is critical to assessing how to best shape the NRC into a more effective regulatory agency that can enable the safe deployment of advanced nuclear energy in the public interest.

Additional recommendations for Congress, NRC staff, management, the Commission, and applicants

NIA believes that Congress, NRC staff and management, the Commission, and applicants and licensees all have important roles to play in ensuring effective and efficient licensing reviews. Many challenges to advanced reactor licensing can be addressed by NRC staff and management, the Commission, and applicants and licensees without the need for additional authorizing legislation from Congress. NIA has published numerous previous reports that provide specific recommendations for the NRC, Congress, applicants, and other stakeholders. Relevant recent NIA reports , briefs, and papers include:

- 2023 NRC Reform Recommendations Discussion Draft Paper
- Unlocking Advanced Nuclear Innovation: The Role of Fee Reform and Public Investment
- NIA Brief: Bridging the Gap on 10 CFR Part 53
- Promoting Efficient NRC Advanced Reactor Licensing Reviews to Enable Rapid Decarbonization
- Nuclear Innovation Alliance Licensing Efficiency Workshop Summary Report
- Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards

Major NIA reports, briefs, and papers with additional relevant recommendations for Congress, the NRC, and applicants are listed below with a short summary for each NIA report or paper. The complete reports, briefs, and papers with detailed recommendations are included as an attachment to this letter and are also available on NIA's website.

- 2023 NRC Reform Recommendations Discussion Draft Paper

  This discussion draft paper identifies challenges to advanced reactor licensing based on interactions with stakeholders including NGOs, advanced reactor developers, utilities, and policymakers. NIA developed draft policy reform recommendations to address these challenges, specifically identifying actions that could be taken by NRC management, NRC Commissioners, and Congress to increase the effectiveness of advanced reactor licensing.

  The draft NRC reform recommendations are intended to serve as a common basis for stakeholder engagement and discussion with policymakers during the 118th Congress. This discussion draft will be updated in late May 2023 (and thereafter) based on continued input and feedback from policymakers and stakeholders on how to improve advanced reactor licensing at the NRC.

  Link to report: https://www.nuclearinnovationalliance.org/index.php/nia-discussion-draft-nrc-reform-recommendations

- Unlocking Advanced Nuclear Innovation: The Role of Fee Reform and Public Investment

  This report evaluates the history and effects of the licensing fee system at the NRC, compares it to other regulatory agencies, finds that the current fee system poses a barrier to carbon free advanced nuclear energy, and recommends options for reform. Alternative fee approaches can encourage nuclear innovation activities while achieving greater public benefits. Fee reform is especially important in the short term as the inefficiency of current NRC regulations leads to higher fee expenses for near-term applications by first movers.

  In this report, NIA recommends that Congress:

  - Significantly reform, modify, or replace the licensing fee cost recovery model to exclude or substantially reduce fees for new license applicants at NRC.

- Alternatively, expand options for Department of Energy (DOE) funding of advanced reactor licensing.
- Expand funding for advanced reactor regulatory infrastructure.
- Reevaluate the NRC funding model for operating reactors to ensure that it is consistent with U.S. climate goals.

Additional details on the effect of the history and effects of the licensing fee system at the NRC as well as on the NIA recommendations are available in the full report.

Link to report: https://www.nuclearinnovationalliance.org/index.php/unlocking-advanced-nuclear-innovation-role-fee-reform-and-public-investment

- NIA Brief: Bridging the Gap on 10 CFR Part 53

  This brief summarizes the NRC's Part 53 rulemaking process for advanced reactors and discusses the different stakeholder critiques of the preliminary rule development process and proposed draft rule. NIA believes that while the current draft proposed Part 53 rule would not facilitate the effective and efficient licensing of advanced reactors, the NRC could create a transformative new rule by making specific changes to the rule structure. The brief describes how the NRC could restructure the draft rule to focus on ensuring applicant compliance with performance-based regulatory requirements and create a regulatory framework that resolves major differences between NRC staff and external stakeholders on the proposed draft rule.

  In this report, NIA recommends that the Commission:

  - Revise the proposed draft rule structure to better align with a performance-based safety requirement framework described by NIA and other stakeholders,
  - Work with external stakeholders and NRC staff to address questions related to the introduction of NRC policy positions as new regulatory requirements, and
  - Direct NRC staff to convert existing draft safety requirements and operational program requirements into optional regulatory guidance or non-mandatory appendices of the rule text for applicants.

  These changes could help the NRC efficiently complete the 10 CFR Part 53 rulemaking process in a way that balances regulatory flexibility and predictability for advanced reactors and enables the commercialization and deployment of advanced nuclear energy. Additional details on the Part 53 rulemaking process and complete NIA recommendations are available in the full brief.

  Link to report: https://www.nuclearinnovationalliance.org/nia-brief-bridging-gap-part-53-rule-development

- Promoting Efficient NRC Advanced Reactor Licensing Reviews to Enable Rapid Decarbonization

  This report discusses the need to promote the efficient licensing of advanced nuclear energy by the NRC to enable the U.S. to meet its clean energy goals. Specifically, it highlights the long duration of the licensing review process (five or more years for some reactor license applications) and the significant uncertainties with duration of the licensing process as a barrier to the investment in and deployment of advanced nuclear energy. The report provides recommendations on how the NRC and industry can both take actions to shorten licensing review timelines while ensuring adequate protection of public health and safety.

In this report, NIA recommends that the Commission and industry focus on process improvements in four main areas:

- Rethinking pre-application engagement to improve process effectiveness and reduce the risk of licensing delays or an unacceptably lengthy licensing process,
- Restructuring the NRC's safety evaluation process to eliminate redundant or outdated process requirements and streamline processes for standardized reactor reviews,
- Prioritizing early management and Commission involvement on key policy issues to identify and resolve important issues early in each license proceeding, thereby reducing uncertainty, inefficiencies, and delays, and
- Establishing effective communication during application review to facilitate more timely reviews, reduce process bottlenecks, and enable more efficient licensing processes.

These changes could help the NRC complete licensing reviews more efficiently, reducing the duration of advanced reactor license reviews while still ensuring adequate protection of the public health and safety. Additional details on reducing licensing review durations and complete NIA recommendations are available in the full report.

Link to report: https://www.nuclearinnovationalliance.org/licensingdurationsforclimate mitigation

- Nuclear Innovation Alliance Licensing Efficiency Workshop Summary Report

  This report summarizes NIA's 2022 Chatham House Rules workshop on Advanced Reactor Licensing Efficiency. The 2022 workshop was held as a follow-up to the 2021 NIA report "Promoting Efficient NRC Advanced Reactor Licensing Reviews to Enable Rapid Decarbonization" The workshop convened stakeholders from both industry and public interest groups to share experiences and insights from prior licensing activities, best practices for licensing engagement and activities, and emerging best practices for new reactor licensing. This report synthesizes workshop presentations and discussions, and provides recommendations on how applicants, NRC staff and management, and the NRC Commission can work together to improve the efficiency and effectiveness of advanced reactor licensing reviews.

  In this report, NIA recommends that the Commission and industry focus on process improvements in five main areas:

  - Achieving and maintaining alignment between applicant and NRC on the licensing review process and creating clear lines of communication
  - Preparing the application content and performing the safety review based on clear, definitive, and consistent expectations
  - Ensuring efficient use of staff resources as the NRC receives an increasing number of advanced reactor license applications
  - Developing processes to identify and resolve challenges encountered during reviews
  - Ensuring uniform understanding and expectations on the role of specific NRC offices and committees in the licensing process.

  Detailed recommendations on each topic for applicants, NRC staff and management, and the NRC Commission are provided in this report. Specific detailed examples from the workshop and recommendations from participants are also highlighted as "focus areas" for each topic and help provide additional insights on best practices for efficient licensing. Additional details on improving

the efficiency and effectiveness of NRC licensing reviews and complete NIA recommendations are available in the full report.

Link to report: https://www.nuclearinnovationalliance.org/nuclear-innovation-alliance-licensing-efficiency-workshop-summary-report

- Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards

  This report evaluates the NRC's Advisory Committee on Reactor Safeguards (ACRS) to determine how the ACRS could better align with Congressional expectations under the Nuclear Energy Innovation Modernization Act (NEIMA) without diminishing the significant role the ACRS has in the review and resolution of key technical issues associated with nuclear power plant regulation. The evaluation included legislative and agency documents on ACRS, meeting transcripts, and interviews with individuals with first-hand experience with ACRS including several current and former members of the ACRS, current and former ACRS staff, several former NRC Commissioners, former NRC Staff, and members of the ACRS stakeholder community.

  This report includes four main NIA recommendations to improve the ACRS accompanied by specific proposed solutions:

  - Refocus the scope and depth of ACRS reviews to maximize ACRS effort on the most safety-significant matters relevant to Commission and NRC licensing reviews,
  - Improve ACRS operation and management to increase the efficiency and effectiveness of ACRS reviews
  - Reduce the cost of ACRS reviews to applicants by eliminating the applicant fees associated with reviews and staff preparation, and
  - Adjust the management of ACRS to help improve the efficiency of staff and ACRS operations and ensure alignment with Commission priorities.

  These changes could help the ACRS operate more effectively and help position the ACRS and NRC to enable the safe and successful deployment of advanced nuclear energy. Additional details on improving ACRS operations and complete NIA recommendations are available in the full report.

  Link to report: https://nuclearinnovationalliance.org/improving-effectiveness-and-efficiency-advisory-committee-reactor-safeguards

NUCLEAR INNOVATION ALLIANCE

July 17, 2023

The Honorable Cathy McMorris Rodgers
Chair
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Jeff Duncan
Chair
Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Frank Pallone, Jr.
Ranking Member
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

The Honorable Diana DeGette
Ranking Member
Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, D.C. 20515

Dear Chair Rodgers, Ranking Member Pallone, Subcommittee Chair Duncan, and Subcommittee Ranking Member DeGette,

Advanced nuclear energy can a play a significant role in meeting our nation's growing need for reliable, affordable, secure, and clean energy. Enabling the full potential of advanced nuclear energy requires that we create the conditions for success for advanced reactor developers and energy users to deploy and operate new nuclear energy. One condition for success is ensuring that we have a regulatory environment in the United States that enables the effective, efficient, and predictable licensing of new nuclear power plants. Congress can play a critical role providing the U.S. Nuclear Regulatory Commission (NRC) and other regulatory agencies legislative direction, authorization, and oversight, and appropriations to ensure that the agencies are meeting the needs of the American people. The House Energy and Commerce Committee and the Subcommittee on Energy, Climate, and Grid Security have an especially important role to play.

The Committee and Subcommittee's activities during the 118th Congress exemplify the active and productive role that Congress can play in creating the conditions for success for advanced nuclear energy. The Subcommittee's legislative hearing on July 18th, 2023, titled "American Nuclear Energy Expansion: Updating Policies for Efficient, Predictable Licensing and Deployment" is a unique opportunity for the Subcommittee to discuss specific regulatory barriers to the deployment of advanced nuclear energy at scale and review specific legislative proposals that can help ensure effective, efficient, and predictable regulations for licensing new nuclear power plants.

The Nuclear Innovation Alliance (NIA) has been performing analysis and actively engaging with stakeholders (including advanced nuclear energy developers, utilities, non-governmental organizations, the NRC Commission, NRC staff and management, and policymakers) to identify barriers to advanced reactor licensing at the NRC and develop detailed recommendations on improving NRC licensing processes. This letter summarizes our key insights from this analysis and engagement that we believe can help inform the Committee's ongoing legislative and oversight activities and provides specific feedback

on several of the pieces of legislation discussed during the Subcommittee's legislative hearing on July 18th, 2023.

NIA's analysis and stakeholder engagement has revealed that while NRC can license advanced reactors under existing law, a combination of operational, cultural, and staffing issues limit the ability of the NRC to provide effective, efficient, and predictable licensing for advanced reactors. The Congress, the Commission, and NRC staff all have important roles to play in overcoming these barriers and creating a regulatory system that can enable advanced nuclear energy deployment. They need to work together to meet the following objectives:

1. Ensure adequate staff capacity and capability to effectively license advanced reactors
2. Ensure existing regulatory procedures and processes enable effective staff review
3. Develop new regulatory processes to improve effectiveness of future regulatory reviews
4. Develop regulatory processes that enable timely commercialization of advanced reactors at scale
5. Establish consistent stakeholder understanding and trust in the regulatory process

If these five objectives are not satisfied, the NRC and the new reactor licensing process will be a significant barrier to the deployment of advanced nuclear energy at scale. NIA believes that addressing the underlying organizational effectiveness, leadership and culture challenges at the NRC and holding NRC leadership accountable for implementation and performance will empower the agency to make internal changes necessary and complete the five objectives listed above.

The NRC must be intrinsically motivated to meet the needs of the moment – external changes to the agency will not produce a more effective licensing process if the NRC staff, management, and Commission do not have aligned motivations and priorities. This letter provides additional details on NIA's recommendations for how the Committee can most effectively address operational, cultural and leadership challenges at the NRC, most important of which is enacting legislation that establishes an independent panel to conduct a comprehensive examination of NRC's organizational effectiveness (with a focus on NRC's leadership, operations, and organizational culture) and make recommendations for improvements. This recommendation would be a critical first step in realigning NRC operations, culture and leadership to create and implement effective and efficient licensing processes for advanced nuclear energy.

NIA has reviewed the legislation to be discussed during the Committee legislative hearing on July 18th, 2023. Many of these pieces of legislation address specific barriers to advanced reactor licensing in existing legislation (e.g., the Atomic Energy Act of 1954) or that the Commission does not have clear legislative direction or authority to address (e.g., applicant fees for certain advanced reactor projects or expedited licensing for new nuclear power plants at existing energy sites). NIA is pleased to provide additional discussion and comments on specific pieces of legislation in this letter including:

- H.R.___, NRC Mission Alignment Act
- H.R.___, Modernize Nuclear Reactor Environmental Reviews Act
- H.R.___, Nuclear Licensing Efficiency Act
- H.R.___, Nuclear Advisory Committee Reform Act
- H.R.___, Efficient Nuclear Licensing Hearings Act
- H.R.___, Advanced Reactor Fee Reduction Act
- H.R.___, Advanced Nuclear Reactor Prize Act
- H.R.___, Advancing Nuclear Regulatory Oversight Act
- H.R.___, Nuclear for Brownfields Site Preparation Act

- H.R.___, Advanced Nuclear Deployment Act
- H.R.___, Nuclear Fuel Security Act
- H.R. 4528, Strengthening the NRC Workforce Act of 2023 (Rep. DeGette)
- H.R. 4530, NRC Office of Public Engagement and Participation Act of 2023 (Rep. Levin)

We believe that overall, this proposed set of bills is a step forward towards a more effective and efficient regulatory framework for advanced nuclear energy, but that it must be conducted in parallel with addressing the underlying operational, cultural, staff, and leadership challenges at the NRC. If Congress only addresses legal barriers to advanced reactor licensing without addressing operational barriers, we will continue to have an NRC that appears to be positioned for success but continues to struggle to license new nuclear power plants effectively, efficiently, and predictably.

We hope that this input helps inform the Committee's on-going work to create the conditions for success for advanced nuclear energy to meet our nation's growing need for reliable, affordable, secure, and clean energy. We thank the Committee for the opportunity to support its oversight and legislative work.

Please contact me (jgreenwald@nuclearinnovationalliance.org) or Dr. Patrick White (pwhite@nuclearinnovationalliance.org) if you have any follow-up questions or requests related to this letter, the Subcommittee's legislative hearing on July 18th, 2023, or any other Committee or Subcommittee activities.

Sincerely,

Judi Greenwald
Executive Director
Nuclear Innovation Alliance

NUCLEAR INNOVATION ALLIANCE

Background and Motivation

The NRC will play a critical role in the development and deployment of advanced nuclear energy in the United States. With numerous advanced reactor companies engaging with the NRC, the number of licensing applications will increase significantly in the coming years. The NRC must successfully license and regulate hundreds of new reactors in the next two decades if advanced nuclear energy is to play a significant role in our future energy mix.

The NRC values independence, openness, efficiency, clarity, and reliability as "Principles of Good Regulation." These principles must be effectively implemented to enable deployment of advanced nuclear energy at the scale and pace essential to combat climate change. The NRC prides itself as a continuously learning organization and is intrinsically motivated to improve the NRC's capacity, capabilities, and processes as a modern regulator that can effectively license novel advanced reactor technologies. Enabling effective licensing and regulation for advanced reactors would help transition the NRC into an innovative regulator that recognizes and internalizes the importance of nuclear power as a climate solution into its core regulatory mission.

In the short term, about a dozen advanced reactor developers are engaging one-on-one with NRC to obtain approvals under existing rules. This is challenging because the current licensing pathways have been tailored to conventional, large, light water reactors. There are many things that NRC and industry license applicants can do to make these early engagements go well. NRC staff and applicants have been making good progress on licensing the Hermes test reactor and the Abilene Christian University research reactor, incorporating lessons learned from NuScale's design approval, which took too long and cost too much. But licensing timelines and costs are uneven, often attributable to inconsistent quality in mundane but important practices like disciplined project management and clear internal and external communication.

The NRC Commission is beginning to dig into the details to improve licensing efficiency. Former Commissioner Baran proposed in June that the Commission request staff input on a proposed Commission policy statement to communicate the Commission's expectations to the NRC staff, the Advisory Committee on Reactor Safeguards, and external stakeholders on the effectiveness, efficiency, and timeliness of new reactor licensing reviews. In a complementary effort, Commissioners Wright and Caputo are working together on a proposal to establish performance metrics to measure NRC's progress in improving licensing efficiency. Under Chairman Hansen's leadership, NRC staff is, for example, piloting an analytics portal that would enable the Commission and the public to track and assess progress.

For the medium term, NRC is in the midst of a multi-year rulemaking on risk-informed, performance-based and technology-inclusive licensing (referred to as "10 CFR Part 53", or more simply "Part 53"). This rulemaking is required under the 2019 Nuclear Energy Innovation and Modernization Act (NEIMA), and a draft rule is before the Commission. As described in NIA's Part 53 paper, the rule is flawed but fixable with leadership by the Commission. And the Commission is stepping up. At its public briefing by NRC staff on May 16th, all five Commissioners asked the staff tough questions and are reportedly working to rewrite the rule themselves or send it back to the staff with specific instructions. Commissioner Caputo in particular said the Commissioners should roll up their sleeves and vote on revisions to the proposed rule. Completion of this work is urgent and important.

For the long term, we need to re-imagine licensing in a world where NRC must license dozens, if not hundreds, of reactors per year. Ultimately, this will require streamlined and standardized NRC processes and practices as well as standardized technologies. Thinking on this topic has only just begun.

The NRC must be empowered to effectively and efficiency complete advanced reactor licensing activities over all three timescales if advanced nuclear energy is to play a role in meeting our nation's growing need for reliable, affordable, secure, and clean energy. Congress, the Commission, and NRC staff all have important roles to create the conditions for success for advanced nuclear energy. NIA has identified six specific barriers to advanced reactor licensing that all stakeholders must address to help ensure the effective and efficient licensing:

1. Challenges to hiring, training, and retaining qualified staff and management with technical and project management expertise necessary to lead licensing reviews of advanced reactors
2. Insufficient accountability for NRC staff in terms of schedule, breadth of scope, depth of review, or regulatory basis for technical and environmental reviews of advanced reactors
3. Inadequate leadership support and prioritization of innovative practices or processes for reviews, licensing, communication, and management
4. Inconsistent stakeholder understanding and trust in the licensing process and the role of different NRC committees and offices in the licensing process
5. Inconsistent project management and staff performance that can result in inefficient use of regulatory resources and applicant fees
6. Inconsistent external communication between stakeholders and the NRC as well as internal communication between NRC staff and management can result in unpredictable regulatory processes or decisions

These barriers represent cross-cutting challenges to licensing and oversight activities by the NRC but are of particular interest and concern for the licensing of new advanced nuclear reactors.

NIA Recommendations for Congressional Action

Congress, and specifically this Committee, can play a critical role in directing NRC to prioritize and support organizational improvements, authorizing additional funding to support NRC licensing activities, and holding the NRC accountable for longer-term operational and cultural improvements through effective and productive oversight. NIA's top recommendations for the Committee to improve NRC's licensing processes and NRC oversight of licensees are:

1. Establish an independent panel to conduct a comprehensive examination of NRC's organizational effectiveness (with a focus on NRC's leadership, operations, and organizational culture) and make recommendations for improvements
2. Require the NRC to develop a Commission policy statement on licensing efficiency, establish metrics for measuring its performance, and provide regular, publicly available reports to the relevant congressional committees on progress against these metrics, including reports on:
    a. project management and organizational communication (including relevant staff and management training activities) with qualitative and quantitative assessments of NRC staff and management performance, and surveys of applicants and licensees
    b. new reactor licensing (including relevant staff preparation and training activities with qualitative and quantitative assessments of applicants and NRC staff performance
3. Conduct regular Committee oversight hearings that focus on cross-cutting NRC organizational performance factors including operations, agency leadership, culture, project management, and communication

4. Increase authorized funding for NRC training, rulemaking, and other cross-cutting activities through off-fee appropriations in combination with fee reform and Commission direction to provide NRC staff and management the tools and support necessary for internal agency reform

NIA believes that addressing the underlying organizational effectiveness, leadership and culture challenges at the NRC and holding NRC leadership accountable for implementation and performance is the most effective way to align intrinsic motivations at the NRC and empower the agency to develop efficient processes to license advanced reactors.

In addition to the NIA's above recommendations on organizational effectiveness, leadership and culture challenges, NIA has also identified additional barriers that can be addressed by the Committee and the Commission to improve NRC's licensing processes and NRC oversight of licensees. The following recommendations would best be addressed by Congressional legislation and the Committee because they require changes to governing legislation or it is unclear whether the Commission has the direction or authority to make the changes:

1. Improve the functioning of the Advisory Committee on Reactor Safeguards (ACRS) by revising the ACRS statutory mandate to limit reviews to unique or novel safety issues referred to it by the Commission and reallocating the costs associated with ACRS reviews to taxpayers
2. Amend the Atomic Energy Act of 1954 to eliminate the requirement for mandatory hearings in uncontested licensing reviews
3. Update the NRC public hearing process to incorporate modern best practices on public engagement and permitting reviews
4. Direct the NRC to pursue rulemaking to significantly reduce costs and duration of environmental reviews for licensing by expanding use of NEPA processes other than environmental impact statements (e.g., categorical exclusions, environmental assessments, and generic environmental impact statements) and reviewing opportunities for increased collaboration with other federal agencies
5. Clarify the Congressional direction on the NRC's mission through legislative amendments to the Atomic Energy Act of 1954 or new legislative direction to the Commission so that the agency mission reflects the importance of efficient and predictable reviews and timely regulatory decisions
6. Provide new legislative direction to the Commission to improve stakeholder understanding and trust in the regulatory process and proactively foster dialogue between NRC staff and communities on licensing and regulatory issues. This could be accomplished by directing NRC to create an Office of Public Engagement or other internal group to support on-going licensing activities outside of engagement normally handled by NRC Public Affairs

These recommendations could be implemented by the Committee and Congress through a combination of legislation and oversight and would address many of the commonly cited procedural barriers to advanced reactor licensing.

the following recommendations could be addressed by the Commission because they focus on NRC operation and could be implemented internally to the organization:

1. Improve the functioning of the ACRS by clarifying in procedure and practice Commission direction to ACRS on prioritizing and performing reviews and providing adequate support for improving staff-level ACRS operations and management
2. Clarify the role of the NRC's Office of General Counsel (OGC) in licensing reviews so that applicants and staff understand its roles, responsibilities, and scope

3. Modernize the NRC public hearing process by identifying opportunities to review and resolve environmental concerns under the National Environmental Policy Act (NEPA) provisions and reducing the scope and formality of its hearing process by adopting more informal, legislative-style hearing protocols when contentions are filed
4. Pursue rulemaking to significantly reduce costs and duration of environmental reviews for licensing by expanding use of NEPA processes other than environmental impact statements (e.g., categorical exclusions, environmental assessments, and generic environmental impact statements) and reviewing opportunities for increased collaboration with other federal agencies
5. Increase stakeholder alignment on meeting the intent of the Nuclear Energy Innovation and Modernization Act (NEIMA) by actively collaborating with stakeholders to agree in concept to licensing frameworks under Parts 50, 52 and 53 that encourage innovation through robust, risk-informed, performance-based, and technology-inclusive regulatory frameworks
6. Provide creative opportunities to proactively seek dialogue between NRC staff and communities, emphasizing the availability of plain-language and native language resources for communities, and more transparent incorporation of community concerns and questions into the regulatory process

These recommendations could be implemented by the Commission, NRC management, and staff, with the Committee and Congress holding the NRC accountable for significant changes through robust oversight and reporting requirements. Effective and lasting change at the NRC requires change from within, and continued productive oversight from the Committee can both empower the NRC and help ensure short-term and long-term accountability.

NIA Comments on Specific Pieces of Proposed Legislation

NIA has reviewed the proposed legislation to be discussed during the Committee legislative hearing on July 18th, 2023. Many of these bills or draft bills address specific procedural or legal barriers to advanced reactor licensing in existing legislation (e.g., the Atomic Energy Act of 1954 as amended) or that the Commission does not have clear legislative direction or authority to address (e.g., applicant fees for certain advanced reactor projects or expedited licensing for new nuclear power plants at existing energy sites). NIA believes that a number of these bills could help resolve barriers to advanced reactor licensing but that they would be most effective if enacted in parallel with organizational effectiveness, leadership, and culture reforms at the NRC. Comments on specific bills are provided below.

H.R.___, NRC Mission Alignment Act

NIA supports the bill's direction to NRC to support efficient, timely, and predictable reviews. NIA also supports clarifying NRC's overall mission but suggests that the Committee evaluate whether clarification of the NRC's mission is best performed directly by the Congress in new legislative direction, amendments to the NRC's enabling legislation, or by the Commission directly through internal NRC processes subject to Committee oversight to most effectively ensure NRC staff acceptance and incorporation of a clarified mission into NRC operations, culture, and regulatory activities.

H.R.___, Modernize Nuclear Reactor Environmental Reviews Act

NIA supports this draft bill since it will enable the NRC to more efficiently conduct environmental reviews for new nuclear power plants, consider expansive opportunities to streamline environmental reviews, leverage other analyses, avoid duplication, and update Part 51 to comply with the Fiscal responsibility Act. NIA suggests that the Subcommittee review the specific language in Section 2 (b)(2)(J) related to environmental review. The draft bill authorizes applicant submittal of their environmental impact statement (EIS) as the basis for the NRC draft EIS but applicants do not currently submit an EIS as part of

new reactor licensing. The bill should clarify if the applicant's submitted Environmental Report (required under 10 CFR Part 51) would be used as the basis for the NRC draft EIS or if the applicant would also be permitted to submit a draft EIS as part of their application as the basis for the NRC draft EIS.

H.R.___, Nuclear Licensing Efficiency Act

NIA supports this draft bill since it provides reasonable schedule certainty for commercial reactor applicants and improves the efficiency of environmental reviews. It also includes provisions for the NRC to review, assess, and revise, as appropriate, licensing performance metrics and milestone schedules required under the NEIMA to provide the most efficient performance metrics and milestone schedules reasonably achievable as gained through experience.

H.R.___, Nuclear Advisory Committee Reform Act

NIA supports this draft bill since it will help refocus the role of the ACRS on reviewing unique or novel safety issues referred to it by the Commission. This will help maximize the impact of ACRS on new reactor licensing and ensure they provide invaluable input to Commission decisions.

H.R.___, Efficient Nuclear Licensing Hearings Act

NIA supports this draft bill since it eliminates the need for hearings in uncontested licensing decisions and encourages the Commission to use informal hearing processes and procedures when there are intervenors. This will help increase the efficiency of NRC licensing processes without reducing public participation or transparency.

H.R.___, Advanced Reactor Fee Reduction Act

NIA supports this draft bill since it helps address the impact of licensing fees on applicants seeking licenses and permits for advanced reactors. NIA suggests that the Subcommittee consider opportunities for broader fee reform (e.g., changing the NRC's fee recovery model) or alternative methods for recovering fees (e.g., cost shares, payment of licensing fees during operation). These changes could increase the impact of the bill on the licensing and deployment of advanced reactors.

H.R.___, Advanced Nuclear Reactor Prize Act

NIA supports this draft bill since it reduces the "first-mover" risks borne by advanced reactor applicants that are attempting to use novel regulatory processes, use cases, or license types for new nuclear reactors. NIA suggest that the Subcommittee could expand the list of applicable prizes categories or provide secondary partial prize awards to incentivize multiple applicants to compete for prize categories.

H.R.___, Advancing Nuclear Regulatory Oversight Act

NIA supports this draft bill because it seeks to improve the operational efficiency of the NRC and maximizes the efficiency of reactor and materials inspection and oversight programs, and seeks to minimize overhead costs of leased office space.

H.R.___, Nuclear for Brownfields Site Preparation Act

NIA supports this draft bill because it directs the NRC to identify how to improve the effectiveness and efficiency of licensing processes at existing industrial energy sites. Incentivizing the reuse of existing environmental sites by utilizing existing environmental assessment information helps reduce the total

H.R.___, Advanced Nuclear Deployment Act

NIA supports this draft bill because it reduces the capital investment needed for reactors on Department of Energy and Department of Defense sites and established expedited review schedules for microreactors, commensurate with their impact to the environment and very low risk to the public.

H.R.___, Nuclear Fuel Security Act

NIA supports this draft bill because it provides additional authorization and direction to the Department of Energy to support the domestic availability of high-assay, low-enriched uranium (HALEU) and low-enriched uranium to meet the needs of existing and new nuclear reactors in the United States. This bill helps provide programmatic clarity to support advanced reactor projects that will require HALEU fuels for their successful demonstration and commercialization.

H.R. 4528, Strengthening the NRC Workforce Act of 2023 (Rep. DeGette)

NIA supports the purpose of this bill but recognizes that hiring and retention bonuses and incentives will not be sufficient for NRC to recruit and retain talent. Improvements to the leadership and organizational culture will be necessary to attract and retain the talent pool needed to meet the projected workload demand. NIA suggests that the Subcommittee incorporate these concerns into the draft bill and address questions related to the authority of the Chairman versus Commission consensus to prioritize supplemental hires and the determination of "severe shortage" for direct hiring authority.

H.R. 4530, NRC Office of Public Engagement and Participation Act of 2023 (Rep. Levin)

NIA supports the purpose of this bill but encourages the Subcommittee to evaluate whether improving stakeholder understanding and trust in the regulatory process is best performed by creating a new Office of Public Engagement and Participation or other internal group to support on-going licensing activities outside of engagement normally handled by NRC Public Affairs. In both cases, a combination of legislative direction with proper and thoughtful implementation by the Commission and active oversight by the Committee is critical to ensuring that the office or group proactively and effectively fosters productive dialogue between NRC staff and communities on licensing and regulatory issues. This bill can help facilitate the more effective and efficient licensing of advanced nuclear technology by increasing public trust, understanding, and participation in the licensing process.

THIRD WAY

May 8, 2023

Committee on Energy and Commerce
US House of Representatives
45 Independence Avenue SW
2125 Rayburn House Office Building
Washington, DC 20515-6115

Chair Cathy McMorris Rodgers
Committee on Energy and Commerce
2188 Rayburn House Office Building

Chair Jeff Duncan
Subcommittee on Energy, Climate, and Grid Security
2229 Rayburn House Office Building

Ranking Member Frank Pallone, Jr.
Committee on Energy and Commerce
2107 Rayburn House Office Building

Ranking Member Diana DeGette
Subcommittee on Energy, Climate, and Grid Security
2111 Rayburn House Office Building

Dear Chair Rodgers and Ranking Member Pallone:

In response to your letter dated April 14, 2023, Third Way's Climate and Energy program has prepared this letter of information and recommendations on US Nuclear Regulatory Commission (NRC) activities involving licensing and oversight of reactors. The attached response outlines the legislative and procedural improvements needed to enable the predictable, technology-inclusive, and risk-informed licensing, regulation, and oversight of the civil nuclear industry. Numerous government and independent studies have shown that the US has a major opportunity to lead the development of advanced nuclear reactor technologies. We believe Congressional direction and support is needed to secure the future of the US nuclear industry, achieve US decarbonization goals, and promote the safe, responsible use of civil nuclear technology globally. We greatly appreciate the opportunity to submit this response to the Committee, and welcome further engagement with Congress to move these developments forward.

Sincerely,

Jonathan Cowan
President
Third Way

Josh Freed
Senior Vice President,
Climate and Energy Program, Third Way

1. Update the mission of the NRC

Goal: Modernize the mandate of the NRC to better internalize the agency's role in protecting the general welfare of people, the environment, and climate.

- **Amend the Energy Reorganization Act of 1974**
    - In Section 201, to emphasize the NRC's responsibility to improve the general welfare of the public and efficiency of the nuclear regulatory process. These changes should be noted specifically in regard to the nation's interest in addressing climate change, decarbonization, fostering national security, and improving environmental quality.
        - The NRC's mission serves as the foundation for the Agency' brand and affirms the culture of the organization in regulating the industry. Updating the mission would have a long-term ideological impact on recruitment, training, and stakeholder engagement.

2. Improve Efficiency of Advanced Nuclear Licensing

Goal: Provide clear guidance to the NRC regarding Congressional expectations for efficiency and overall performance

- **Amend the Nuclear Energy Innovation and Modernization Act (NEIMA)**
    - In Section 103 (a)(2), to emphasize the application of risk-informed licensing practices to the 'maximum extent practicable' rather than simply 'where appropriate'.
- **Direct the NRC to develop review schedules that meet legislatively codified timelines for nuclear reactor licensing.**
    - The NRC generic schedule for licensing a non-LWR reactor under Parts 50 and 52 is 36 months.[1] Congress should codify this timeline in legislation by making it the performance threshold for all first-of-a-kind reactors. For any licensing activity beyond **36 months,** the NRC should have to brief the relevant committees of Congress in-person with sufficient explanation to the causes of the delay.
    - Additionally, for any subsequent build of a significantly similar design, or next-of-a-kind reactor, the NRC should be expected to develop a more efficient process that is capable of rendering a licensing decision in no more than **18 months.** Such a timeline would engender efficiency and enable the expeditious deployment of new nuclear reactors to address decarbonization needs.

[1] 'Generic Schedules'. NRC.gov. https://www.nrc.gov/about-nrc/generic-schedules.html

- **Direct the NRC to explore the impact of a rule change to 10 C.F.R. Part 52.104 to allow for granting of a license for a duration beyond 40 years.**
    - Current NRC regulations only allow for a combined license to be granted for up to 40 years.[2] However, currently operating reactors have demonstrated that the life for a nuclear plant extends well beyond 40 years. Advanced nuclear reactors benefit from innovations and improvements upon many current reactor designs that enable an 'off-the-shelf' life of 60 years or more. The NRC should assess changes to regulations that would enable licensing of advanced reactors for longer than 40 years. Such changes would promote efficiency and reduce the regulatory burden by avoiding unnecessary subsequent license renewals, as well as reduce costs to innovators for making safe, durable technology.

3. Increase Flexibility + Timeliness of Environmental Reviews

Goal: Reduce redundancy of environmental reviews, promote efficiency by allowing for acceptability of third-party EIS, enable broader applicability of environmental assessments for scaled technology.

- **Direct the NRC to develop schedules for environmental reviews that meet legislatively codified timelines.**
    - The NRC's generic timeline for an environmental review related to an early site permit is 18-24 months, with a slightly shorter estimate for renewals and up to 2 years for a new permit.[3] However, this range only includes activities up to the issuance of the final Safety Evaluation Report rather than the issuance of a permit. Congress should direct the NRC to update its review timelines to complete all permitting actions, including advisory committee meetings and hearings related to environmental reviews, within **24 months**. This benchmark would provide for predictability and consistency among different environmental reviews.

- **Allow for the broader application of Environmental Assessments (EA) rather than requiring a complete Environmental Impacts Statement (EIS).**
    - Scaled technology such as microreactors and small modular reactors (SMRs) can pose dramatically lessened impacts on the environment than large light water reactor projects. As such, the NRC should explore revising 10 C.F.R. Part 51.20 to expand the use of EAs, where appropriate, for various types of technology. Such changes are aligned with the mandate for a risk-informed licensing approach and could promote efficiency by reducing the staff burden to conduct more intensive site-specific EIS, or generic EIS activities.

[2] Part 52—Licenses, Certifications, And Approvals For Nuclear Power Plants. NRC.gov. https://www.nrc.gov/reading-rm/doc-collections/cfr/part052/full-text.html#part052-0104
[3] 'Generic Schedules'. NRC.gov. https://www.nrc.gov/about-nrc/generic-schedules.html

- **Consider the use of categorical exclusions and harmonize standards across other relevant Federal agencies**

    - The NRC should use categorical exclusions, in whole or part, for advanced reactors. This would mirror the standards of practice implemented by other federal Agencies such as the Department of Energy. Such changes would promote more streamlined reviews and allow greater flexibility for different technologies.

    - Congress should also direct the NRC to harmonize the standards for radionuclide pollutants, to the maximum extent practicable, with the performance standards and statutory definitions of other Federal agencies, with specific consideration on aligning to standard of the U.S. Environmental Protection Agency as defined in Section 112 of the Clean Air Act (42 U.S.C. 7412). Aligning federal standards is good practice to improve clarity of federal regulations and consistency across regulatory agencies.

- **Amend the Atomic Energy Act of 1954 (AEA)**

    - In Section 189, to remove the mandatory hearing requirement for next-of-a-kind deployments. The AEA requires the NRC to hold a hearing "on each application under section 103 or 104 b" of the Act. Such mandatory hearings can cause administrative delays due to scheduling and are furthermore required even in cases where there are no contentions, and no notable concern regarding an application from the Commission or applicant. Eliminating the mandatory requirement and rendering hearings for next-of-a-kind reactors effectively optional would provide greater efficiency and flexibility for the Commission.

4. Reduce Burden + Increase Predictability of User Fees

Goal: Engender increased predictability of licensing costs and increased accessibility of the NRC to new nuclear developers.

- **Reform the Fee-Recovery Structure for User Fees across all applications**

    - The NRC is currently required to recover ~90% of its budget authority through fees. These fees come in the form of "annual fees" paid by all licensees and "user fees" paid by users for services that the NRC provides. Fees are derived from calculations in the agency's annual "Fee Rule Work Papers" and based on costs for staff time spent on applicant activities as well as associated administrative costs and other activities.

    - *At-minimum*: The fee-recovery structure should be changed to reduce the burden on users for administrative and other costs that are calculated into the fee base. An optimal solution would be to align support for the NRC with funding methods for other federal regulatory agencies and provide more substantial support through appropriations for Agency services.

    - **Such changes would:** reduce the burden on developers and operators, thereby reducing costs of deploying new technology and enabling savings to be passed onto consumers or reallocated to further innovation.

- **Establish Caps on Pre-Application and Post-Docket User Fees**

    - NEIMA established a cap on annual fees to be collected by the NRC. Other introduced legislation has addressed the need to reduce the hourly fee rate, and thereby overall costs to be incurred. However, there are not yet legislative provisions to implement improved predictability of costs for licensing activities. This is especially important as the length of time that companies have spent in pre-application engagements for first-of-a-kind advanced reactors has increased substantially.

    - **User fees for docketed applications** should be capped at the value of the hourly fee rate multiplied by the estimated staff hours related to the NRC's generic milestone schedule or the review schedule mandated by Congress, where applicable. The NRC should be granted authority to waive the cap in the event of delays caused by the applicant, poor application quality, or if the time staff has spent on an application exceeds the estimate related to the generic schedule by more than 20%.

    - **User fees for pre-application review activities** for a first-of-a-kind reactor license should also be capped to promote early and consistent engagement from developers on new technology. Such changes would allow pre-applicants to have a clear understanding of the capital needed to license new designs, which will help promote private investment. A cap would also incentivize new applicants to engage the NRC less conservatively by reducing the financial burden of regulatory outreach.

5. Update the Function of the Advisory Committee on Reactor Safeguards

Goal: Focus and streamline the engagements of the Advisory Committee and provide for the most efficient licensing and permitting practices agency-wide.

- **Amend the Atomic Energy Act of 1954 (AEA)**

    - In Section 29, to allow for the ACRS to review an application in part; and to allow for the waiver of an ACRS review for constitution permits, SERs for early site permits, operating licenses for subsequent build of previously licensed designs, and license renewals.

    - **Such changes would:** streamline the processes for permitting activities to reduce the timelines for final permitting decisions, reduce the risk of delays due to administrative reasons, and promote efficiency by reducing redundant assessments of functionally similar technology unless absolutely necessary.

6. Provide Direction + Necessary Resources for NRC Staffing and Training

Goal: Enable the NRC to recruit, retain, and train talent to license and oversee the next generation of nuclear reactors.

- **Direct NRC to develop and deliver to Congress a plan for operationalizing additional off-fee funding to recruit, onboard, and develop new staff.**
    - The NRC needs support for its efforts to recruit and train new staff to conduct reviews. However, the impending staff retirements pose exceptional challenges for the agency's ability to train and manage knowledge across teams, as many senior staff will be leaving the agency. To solidify support for additional resources and provide transparency of Agency direction, the NRC should provide a comprehensive report to Congress on its plans to meet this challenge. The report should identify expectations for staff efficiencies in the training process, the development of clear performance standards necessary to meet improved efficiencies, detailed summary of the NRC's use of its hiring authorities with an emphasis on identifying any occasions where greater authority may have aided retention, and all current and future efforts to educate current and prospective staff on the NRC's updated mission through recruitment activities and continuing training.
- **Expand NRC Scholarship and Fellowship programs to allow individuals to apply directly.**
    - The nuclear education supported by this NRC's University Nuclear Leadership Program (UNLP) funding is intended to benefit the nuclear sector broadly. However, the Nuclear Education Programs are designed to function institutionally, thereby benefiting specific programs. While there is significant value in this approach, expanding scholarship and fellowship programs to offer individuals the ability to apply directly could help the NRC proactively engage with prospective recruits. This addition would offer more flexibility for students who seek scholarship funding but are not already in a grant program. The NRC should also be required to collect cohort data on the students who receive support including metrics on their progress through the higher education system and into the nuclear industry.
    - The NRC could also explore allowing students to apply for a scholarship prior to being accepted in an engineering program by making the award conditional upon enrollment. This type of scholarship would increase access for students and incentivize those who may not prioritize an engineering degree to move into the field.

7. Bolster + Align International Export Readiness Activities

Goal: Enable the NRC to engage in regulatory capacity building and export readiness activities consistently and proactively.

- **Expand the Office of International Programs to include export readiness activities and provide additional funding.**
    - The NRC's Office of International Programs (OIP) advises the Commission on matters related to international activities and requests for NRC engagements overseas. The OIP acts as the NRC's liaison for foreign governments and the broader interagency. With improved coordination among the interagency lead from within the US government, OIP needs to be appropriately positioned to scale its engagement with interagency efforts on advanced reactor exports, regulatory harmonization, and global capacity building for civil nuclear energy.
    - The NRC should commit more full-time equivalents (FTEs) to OIP, as well as consider a restructuring that would align all of the agency's international activities with OIP. NRC staff should investigate how such a restructuring could be achieved by identifying potential challenges, opportunities, and any additional resources that would be needed to support enhancing OIP's international engagement.
- **Amend NEIMA to explicitly exclude international activities from the fee base.**
    - Include additional funding for international activities within the Advanced Reactor Regulatory Infrastructure Activities (ARRIA) account to support regulatory harmonization efforts and international engagement on advanced reactor licensing standards and practices.
    - Explicitly direct the Commission to coordinate NRC's work related to exports and international cooperation, as well as to prioritize the agency's international engagement based on coordination with the interagency, such as the Department of State, Department of Energy, the Executive Office of the President, and other agencies of relevance to civil nuclear cooperation.

8. Amend the Price-Anderson Act to automatically renew every 20 years

Goal: Align US policy with internationally supported practices and standards and enable the growth of the US-led and globally competitive advanced reactor industry.

- **Amend the Price-Anderson Act to automatically renew every 20 years, subject to cancellation by Congress.**
    - The Price-Anderson Act (PAA) was intended to provide support to the new US nuclear industry as it grew. Even after it became well-established, a key argument for extension in the 1970s was to enable coverage for any future industry expansion, mirroring nuclear trends today. The NRC has referred to the Act as **"prudent public policy"** with **"negligible costs to the public"**.[4]

[4] The Price-Anderson Act -Crossing the Bridge to the Next Century: A Report to Congress. October 1998. https://www.nrc.gov/docs/ML1217/ML12170A857.pdf .

- **An ideal solution—automatically renew the PAA every 20 years unless rejected by Congress.** Updating the renewal process to provide for the automatic continuation of PAA unless Congress votes to reject it would make renewal much more seamless. This would ensure there are no gaps in protection or other unnecessary impacts to the industry as Congress considers the future of the Act. This method would retain Congress' ability to amend or end the PAA through legislative action that should require a three-fifths majority. Implementing a three-fifths threshold for ending the Act would ensure that such a significant action has the substantial support of Congress.

- ***If nothing else:***

  - **Extend the PAA through at-least 2065.** An extension to at least 40 years would support the deployment of new plants, as they will be licensed and insured for 40-year lifetimes. Synergizing this timeline will improve investor confidence and capital access in the financing of new nuclear projects, while also assuring insurers that legacy liability protections will exist throughout the plant's operating life.

United States Nuclear Industry Council
1317 F Street NW Washington, DC 20004

May 4, 2023

To:

The Honorable Cathy McMorris Rodgers
Chair, Committee on Energy & Commerce
U.S. House of Representatives
Washington, DC 20515

The Honorable Frank Pallone, Jr.
Ranking Member, Committee on Energy & Commerce
U.S. House of Representatives
Washington, DC 20515

The Honorable Jeff Duncan
Chair, Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, DC 20515

The Honorable Diana DeGette
Ranking Member, Subcommittee on Energy, Climate, and Grid Security
U.S. House of Representatives
Washington, DC 20515

Dear Chairs Rodgers & Duncan, and Ranking Members Pallone & DeGette:

The United States Nuclear Industry Council (USNIC) is the leading U.S. business advocate for advanced nuclear energy and promotion of the American supply chain globally. USNIC represents approximately 90 companies engaged in nuclear innovation and supply chain development, including technology developers, manufacturers, construction engineers, key utility movers, and service providers.

Over the past several years, USNIC, along with many other nuclear energy advocates, has highlighted the importance of advancing the United States' efforts to maintain leadership in the development of advanced nuclear technologies. This effort is vital to U.S. security. Nation-state nuclear offerings of China are expanding precipitously, and despite hostilities reflected in the invasion of Ukraine, Russia appears to remain an acceptable supplier— and both are a direct threat to the U.S. and our international interests. Moreover, advanced nuclear technology is perhaps the singularly most effective technology to address climate change and to provide reliable, cost-competitive, zero-carbon energy, without which it will be realistically impossible to meet the numerous and ambitious goals set for carbon reduction.

USNIC appreciates the opportunity to respond to this request for information, and thanks the committee for your leadership in nuclear energy. The companies we represent, and the industry at large, have benefited and continue to benefit from several pieces of key legislation in support of nuclear technology. USNIC understands that, pursuant to the Committee's responsibilities over the regulation of nuclear energy, its Subcommittee on Energy, Climate, and Grid Security will pursue oversight activity and legislative proposals relating to the Nuclear Regulatory Commission (NRC) and its reactor licensing and oversight activities.

As requested in your letter of April 14, 2023, to assist the Subcommittee's considerations, we are providing the following information and recommendations to improve the licensing review and approval process.

Overall, USNIC supports the Congressional statement in the Atomic Energy Act of 1954 that the use of civilian nuclear energy be directed "to make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and

security" and that "the development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise." The rich history of nuclear development and deployment of nuclear energy technology, at home and abroad, represents the realization of these ambitious goals; and the efforts underway industrywide to deploy new and advanced technologies will continue this legacy.

In order to further the achievement of these goals, the NRC's licensing and regulatory activities must focus on providing reasonable assurance of adequate protection of public health and safety; in doing so, the NRC must refine and redirect their actions to assure efficient, timely, and predictable regulation that provides for a robust and growing nuclear industry, consistent with the goals of the Atomic Energy Act. Furthermore, USNIC believes it is important for the licensing, regulation, and oversight of the civil nuclear industry to be predictable, efficient, risk-informed, performance-based, and protective of public health and safety.

Existing and advanced nuclear energy is vital to meet clean energy deployment, emissions reduction, and national security goals. New nuclear deployment also will enable the U.S. to compete with Russia and China, create U.S. technology jobs, restore U.S. nuclear energy leadership, and reduce adverse health effects of reliance on fossil fuels. NRC review and approval of license applications is an important and necessary step for commercialization of advanced nuclear technologies.

Initial License Reviews

Today there are several license applications under review by the NRC, and several more applications that will be formally submitted in the coming months. These includes major Department of Energy cost-shared Advanced Reactor Demonstration Program awardees, and other DOE-funded advanced nuclear programs. These first movers are utilizing the existing regulatory frameworks under Parts 50 and 52 of Title 10 in the U.S. Code of Federal Regulations (10 CFR 50 and 52). It is essential that the NRC adopt and maintain a sense of urgency to review and license these advanced reactors efficiently and effectively.

10 CFR Part 53

It is unquestionably true that advanced reactors can be licensed under the existing regulatory framework discussed above. However, in the interest of long-term regulatory efficiency, 10 CFR Part 53, if properly crafted, will enable more effective, rapid, large-scale deployment of multiple new nuclear reactors. While the NRC staff have incorporated some innovative and useful licensing requirements and tools into the draft rule recently presented to the Commission, it also includes additional new regulatory requirements, resulting in a draft rule that is not only less efficient than the existing framework under 10 CFR Parts 50 and 52, but which also *increases* regulatory burden. The significance of this outcome cannot be overstated: as the industry is developing designs with significant increases in safety margin, for the NRC to propose a rule that increases the regulatory burden for those designs is not only counterintuitive, it also runs counter to Congressional direction associated with a new regulatory framework, and acts as a significant deterrent to domestic nuclear technology development. Unfortunately, due to these additional requirements, the current draft rule that is before the Commission is unworkable. Congress, NRC, and stakeholders need to take the time to get the new rule right.

The draft 10 CFR Part 53 rule must be restructured to address major concerns discussed by USNIC (and other organizations):

1. Combine into a single framework. The NRC staff's introduction of two separate frameworks (Framework A and Framework B) is problematic. The two-framework approach is difficult for developers to use because they may be using elements of both frameworks in their license

applications, and two frameworks can create extra work and confusion for both the applicant and the NRC staff.

2. Remove As Low As Reasonably Achievable (ALARA) as an expanded design requirement. Elevation of ALARA to a design requirement significantly increases regulatory burden and can greatly increase costs for no additional safety benefit beyond current practice. Additionally, the lack of NRC guidance to reliably judge what is "good enough" in meeting new ALARA requirements have the potential to make this an unbounded problem.
3. Remove the requirements to design to provide additional protection for "Beyond Design Basis Events." In a risk-informed framework, existing requirements for protection against what are today considered Beyond Design Basis Events are adequate. Requiring the rigor applied to design basis events evaluation, beyond what is established in a risk-informed evaluation, adds significant burden without safety benefit.
4. Remove the Facility Safety Program. The proposed construct for a new programmatic layer in a facility licensing basis is duplicative to existing programs, and adds significant additional regulatory burden with no indication of any significant benefits.
5. Reconcile New Programs and Terminology. These issues include maintaining the standard of "reasonable assurance of adequate protection," rather than picking new untested language; as well as not imposing a new requirement for a detailed probabilistic risk assessment at the construction permit phase (which is not meaningful, and often even impossible, because of the level of design detail that supports a construction permit).

A new advanced reactor regulatory framework *could* assist in more efficient licensing and deployment of advanced, U.S.-developed nuclear technology for electricity production, industrial process heat needs, hydrogen production, and other applications. However, the concerns listed above and others will need to be resolved before potential applicants will consider using the 10 CFR Part 53 rule. The overarching theme of these major concerns is the NRC putting prescriptive details into the rule language. These details are more appropriate for guidance.

Companies and trade associations have collaborated over the past two years and committed extensive amounts of resources to review and comment on preliminary 10 CFR Part 53 language as it was made available. As an example, in November 5, 2021, USNIC and the Nuclear Energy Institute submitted over 100 pages of detailed comments and concerns regarding the language (USNIC/NEI Comprehensive Comments on Part 53; NRC Accession Number=ML21309A578). These comments were supplemented in a subsequent letter on April 30, 2022. Industry also provided over 20 public sets of comments in NRC public meetings and on the *regulations.gov* website, as requested by NRC. NRC staff's responses to these multiple rounds of comments was extremely limited, typically consisting of statements expressing appreciation for the comments, but in almost all cases providing little to no substantive feedback. Public meetings intended to contribute to dialog on development of the proposed rule, to ensure understanding of the significance of stakeholder comments, and to seek alignment on changes to address those comments, failed to accomplish that intent. Future public engagement is essential, but is only likely to be productive if NRC Commissioners direct the staff to host interactive and collaborative meetings with external stakeholders that afford open dialog to achieve consensus.

NRC Leadership

The NRC needs to become more efficient in achieving its mission, or else there will be ongoing delays in approval of advanced nuclear technologies. Leadership must communicate the urgency of efficient regulation and licensing of a new generation of clean energy, recognizing the competitive threats from China and Russia as they develop and deploy advanced nuclear technology domestically, and actively market their offerings internationally. Stakeholders perceive that many of the NRC staff share the desire

to be more efficient. For instance, at the 2023 NRC Advanced Reactor Stakeholder meeting, NRC staff were open to improving their audit and "Request for Additional Information" processes, and improve their project management practices. Initiatives such as these must be adopted widely within the agency, and the NRC organization must be further modernized to enable and empower the staff to meet the goal of being more efficient, particularly in light of the volume of new applications they are projected to receive.

Efficiency is touted by the NRC as a Principle of Good Regulation, but that principle is not always realized; this challenge can be resolved, however, if NRC recognizes and embraces innovative ways to move faster and maintain the same level of safety in regulatory decision making. NRC leadership must prioritize and support movement toward more efficient regulation and must monitor performance against quantitative goals in this regard.

As a separate matter, when the NRC considers public health and safety, they focus on the health and safety of people near nuclear sites. NRC practices do not provide for consideration the significant adverse public health impacts— to U.S. citizens across the country— resulting from air pollution from fossil fuel use, as well as the dangers of more intensive storms and other adverse impacts from climate change. NRC's environmental evaluations discuss these adverse impacts only peripherally in terms of discussion of a "no action" alternative in NRC environmental impact statements. But the actual NRC safety review that establishes the licensing basis for a facility has no provisions for such an evaluation, and certainly no way to assess the impacts of delays in nuclear facility licensing from NRC inefficiency or application of requirements beyond "reasonable assurance of adequate protection."

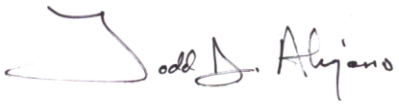
Advisory Committee on Reactor Safeguards

The Nuclear Innovation Alliance and the Pillsbury law firm prepared a March 2023 report that offered suggestions on "Improving the Effectiveness and Efficiency of the Advisory Committee on Reactor Safeguards (ACRS)" (https://nuclearinnovationalliance.org/nuclear-innovation-alliance-statement-release-new-report-improving-effectiveness-and-efficiency). These suggestions included consolidation of Full Committee and Subcommittee meetings to avoid duplication; Congressional direction to revise the ACRS' statutory mandate in the Atomic Energy Act to emphasize that the ACRS should review only novel and safety-significant issues; and removal of the requirement that the ACRS must review *all* construction permit and operating license and renewal applications (irrespective of novel features). Additionally, Congress should exclude the cost of ACRS reviews, including all NRC staff time used to prepare for ACRS meetings, from fee recovery. These and other measures will focus ACRS' efforts on novel and safety-significant matters, reduce review time on less important issues, increase overall review efficiency, and avoid financial burden on developers.

We appreciate your efforts to review NRC's policies and actions that can allow U.S.-developed nuclear energy to make the maximum contribution to the general welfare, and contribute to the nation's common defense and security. Thank you for requesting industry input. In addition to the issues discussed in detail above, USNIC stands ready to engage further, upon request by the committee, on matters of oversight of advanced nuclear reactor technologies, management of regulatory costs and fees, public health and safety, staff effectiveness and culture, collaboration with the Department of Energy, and international activities.

If you want additional information, please contact us.

Sincerely,



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CC:
Jeff Merrifield, Chair, Advanced Nuclear Working Group, USNIC
Peter Hastings, Vice-Chair, Advanced Nuclear Working Group, USNIC
Cyril Draffin, Senior Fellow, Advanced Nuclear, USNIC

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July 18, 2023

The Honorable Cathy McMorris Rodgers
Chair, House Energy and Commerce Committee
United States House of Representatives
Washington, DC 20515

The Honorable Frank Pallone
Ranking Member, House Energy and Commerce Committee
United States House of Representatives
Washington, DC 20515

The Honorable Jeff Duncan
Chair, Energy, Climate, and Grid Security Subcommittee
United States House of Representatives
Washington, DC 20515

The Honorable Diana DeGette
Ranking Member, Energy, Climate, and Grid Security Subcommittee
United States House of Representatives
Washington, DC 20515

Dear Chair Rodgers, Ranking Member Pallone, Chair Duncan, and Ranking Member DeGette,

On behalf of the Uranium Producers of America (UPA), thank you for holding an Energy, Climate, and Grid Security Subcommittee legislative hearing on "American Nuclear Energy Expansion: Updating Policies for Efficient, Predictable Licensing and Deployment." We thank the Committee for its recent approval of H.R. 1042 to prohibit Russian uranium imports and appreciate the release of the discussion draft of the "Nuclear Fuel Security Act." Banning Russian uranium imports and expanding the Strategic Uranium Reserve as provided in the discussion draft are crucial steps toward reestablishing U.S. nuclear fuel cycle capabilities.

Today, uranium powers one out of every five American homes and provides half of our carbon-free power. Uranium is necessary to produce the high-assay, low-enriched uranium (HALEU) needed for several advanced reactor projects under development. U.S.-produced uranium is also required to power the nuclear Navy and for nuclear deterrence, with national defense requirements for uranium expected to expand in the years ahead. Yet in 2022, Russia, Kazakhstan, and Uzbekistan supplied nearly half of the United States' natural uranium purchases. U.S. and other western uranium producers have been undercut in recent years by price insensitive uranium imports from state-owned entities. Russia and China continue seeking more control over global uranium markets and it is long past time for the U.S. to take swift action to rebuild its nuclear fuel cycle.

H.R. 1042, which would prohibit Russian uranium imports, would provide necessary long-term market certainty around Russian uranium supply to encourage investment across the fuel cycle, including mining, conversion, and enrichment. The discussion draft for the "Nuclear Fuel Security Act" would work in tandem with the Russian uranium import ban to ensure domestic capacity to produce both the low-enriched uranium (LEU) needed by our current reactor fleet and the HALEU needed for advanced nuclear projects. The bill would merge the existing Strategic Uranium

Reserve for mined and converted uranium into the American Assured Fuel Supply Program. This will serve as a backstop to address potential supply disruptions under which uranium cannot be obtained through normal market mechanisms or under normal market conditions. The discussion draft also directs DOE to make HALEU and LEU commercially available in such a manner that promotes diversity of supply in domestic fuel cycle capabilities. Importantly, the bill requires DOE to utilize only uranium produced, converted, and enriched in the U.S. or, if domestic options are not practicable, a country that is an ally or partner of the U.S. We urge the committee to take up the discussion draft and we look forward to working with you to advance the bill through the legislative process.

Thank you again for holding this critical hearing, and we look forward to working with you to secure our nuclear energy future.

Sincerely,

Jon Indall
Counsel, Uranium Producers of America