May 15, 2025

Commissioners
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Transformative Regulatory Reform for New Reactors

Dear Chairman Wright and Commissioners Caputo, Hanson, Crowell, and Marzano,

The Nuclear Regulatory Commission (NRC) Non-power Production or Utilization Facility (NPUF) License Renewal rulemaking (RIN 3150-AI96; NRC-2011-0087)[1] has the potential to accelerate the deployment of new nuclear reactors that pose a low risk to public health and safety. The rulemaking demonstrates the NRC's commitment to improve its regulatory framework and aligns with Congressional mandates in the *Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy* (ADVANCE) *Act*[2] and the *Nuclear Energy Innovation and Modernization Act*[3] (NEIMA).

While the NPUF rulemaking primarily focused on the NPUF license renewal process, by clarifying and revising the following definitions — "non-power reactor," "research reactor," and "testing facility" — the rulemaking clarified that certain non-power reactors can be used for commercial and industrial purposes. This change opens the aperture of what reactors could be classified as non-power reactors and therefore be subject to different regulatory requirements commensurate with a reduced risk profile. This rulemaking enables more appropriate and proportional performance-based requirements based on the safety profiles of "commercial non-power reactors" with reduced radioactive inventories, robust fuel forms, inherent safety features, or other risk-reducing design, siting, or operational features.

In particular, this rulemaking allows reactors that can demonstrate compliance with a performance-based 1 rem total effective dose equivalent (TEDE) accident criterion to use a more flexible regulatory framework and be licensed under Section 103, "Commercial Licenses," of the *Atomic Energy Act of 1954* (AEA) and Title 10 of the *Code of Federal Regulation*s (10 CFR) Part 50.22, "Class 103 licenses; for commercial and industrial facilities." In practice, these reactors can use the NRC's current NPUF requirements even if the reactor is not "useful in the conduct of research and development activities" and exceeds the financial criteria in Section 104 of the AEA and 10 CFR 50.22.[4]

This change could be the most timely and effective way to establish a more efficient regulatory framework for new and advanced reactors because it does not require additional statutory changes by Congress, or near-term rulemaking or guidance development by the NRC. The NRC

[1] https://www.federalregister.gov/documents/2024/12/30/2024-30721/non-power-production-or-utilization-facility-license-renewal
[2] https://www.epw.senate.gov/public/index.cfm/2024/7/signed-bipartisan-advance-act-to-boost-nuclear-energy-now-law
[3] https://www.congress.gov/bill/115th-congress/senate-bill/512
[4] The NRC staff have submitted a rulemaking plan (ML24347A171) in accordance with the ADVANCE Act revising the financial criteria. The ADVANCE Act language will be used throughout this letter.

already has extensive experience licensing non-power reactors, and there is an existing body of regulatory guidance for the non-power reactor licensing framework. The NRC also has broad authority to risk-inform its regulatory requirements within the Section 103 licensing framework, and the NPUF rule demonstrates that the non-power reactor rules can be utilized by Section 103 licensees.

The NRC should take the NPUF framework forward and apply the same regulatory requirements to commercial (e.g., power-producing) reactors of the same risk profile, regardless of their end use. This change would create requirements that are performance-based instead of using the prescriptive historical regulatory construct tied solely to the production of power. Figure 1 illustrates the options for how power reactors and non-power reactors can be licensed as commercial and industrial facilities or for research and development activities using the new performance-based criteria.

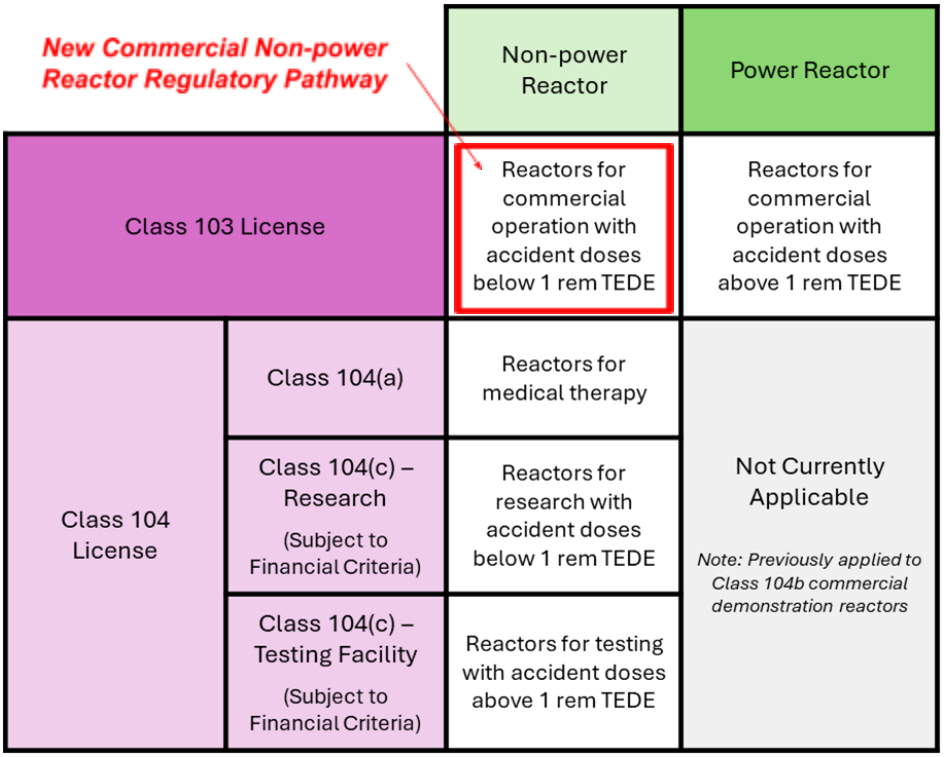

Figure 1. New Licensing Options for Power Reactors and Non-power Reactors after December 30, 2024

The following enclosure describes the impact of the rulemaking, recommends that the NRC initiate multiple, rapid pilots to determine how the NRC can issue a Class 103 license for a commercial non-power reactor under its current regulatory framework, and recommends the NRC potentially clarify the interaction of the license classes and reactor definitions. The pilots should be initiated and completed as soon as possible to demonstrate the viability of this new licensing pathway.

The undersigned organizations commend the NRC and acknowledge the potential to benefit both the industry and the NRC. These changes will spur the deployment of new nuclear energy projects while maintaining predictability under the NRC's current regulatory framework. Please do not hesitate to reach out for additional information or to discuss this letter.

Sincerely,

Nicholas McMurray
Managing Director,
International and Nuclear Policy
ClearPath

Brett Rampal
Senior Director,
Nuclear and Power Strategy
Veriten

Victor Ibarra, Jr
Senior Manager, Nuclear Energy
Clean Air Task Force

Patrick White
Regulatory Expert, Nuclear Energy
Clean Air Task Force

Reactor Licensing Classes and Reactor Types

Historically the NRC uses two separate sets of terms to characterize the different licensing classes, regulatory requirements, and licensing expectations for nuclear reactors. These two sets of terms are:

- Reactor License Class: Class 103 or Class 104 license
- Reactor Type: Power Reactor or Non-power Reactor

The reactor license class directly relates to the statutory basis in the *Atomic Energy Act of 1954* (AEA) for licensing and operating civilian nuclear reactors. Class 103 reactor licenses are issued for reactors constructed and operated for commercial and industrial purposes.[5] Class 104 licenses are issued for facilities constructed and operated for medical therapy, research, or development activities.[6]

The NRC has delineated between the reactor types ("power reactor" and "non-power reactor") through rulemaking and guidance development. However, neither of these terms are in the AEA and the AEA does not distinguish between facilities that do or do not produce power. This distinction originates from the NRC to support the implementation of regulatory requirements that could vary for different types of reactors. Power reactors are subject to the "full set" of regulatory requirements in Title 10 of the *Code of Federal Regulation*s (10 CFR) Part 50 and 10 CFR Part 52,[7] irrespective of whether these requirements are appropriate for a given design. Non-power reactors are formally defined in 10 CFR Part 50 and are subject to more limited regulatory requirements.[8] A reactor that does not fall within the non-power reactor definition in 10 CFR Part 50 is subject to the power reactor regulatory requirements.

The terms power reactor and non-power reactor are largely historical terms of convenience. When the Atomic Energy Commission and later the NRC were developing regulations for reactor licensing in 1960s and 1970s, there was a recognition of the different potential hazards of large reactors (hundreds to thousands of megawatts) being developed for commercial electrical power production purposes and of small reactors (single watts to tens of megawatts) being used for medical, research, and development purposes. Applying the regulatory requirements of large reactors would be unnecessary for small reactors, so the terms power reactor and non-power reactor were developed and used to broadly describe large and small reactors. Non-power reactors still produce thermal power and could be used to produce electrical power, but do so on a scale significantly smaller than large electrical power reactors.

While the divisions created by Class 103 and Class 104 licenses were similar to the power reactor and non-power reactor definitions based on conventional usage, they are actually separate sets of legal distinctions and regulatory requirements. Typically, a Class 103 licensed reactor is regulated as a power reactor. However, there is no legislative or regulatory prohibition

[5] https://www.govinfo.gov/content/pkg/COMPS-1630/pdf/COMPS-1630.pdf
[6] ibid.
[7] The regulatory requirements and process in 10 CFR Part 52 are only applicable to power reactors or nuclear power facilities.
[8] https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/full-text.html#part050-0002

that would prevent a Class 103 licensed reactor from being regulated as a non-power reactor if it met the regulatory definitions for the reactor type. In fact, the NRC's NPUF rulemaking refers to "licenses issued to non-power commercial facilities under the authority of Section 103 of the AEA."[9]

Impacts of the NPUF Rule

Please note: For the remainder of this enclosure, key terms used or defined in the AEA or CFR are emphasized with color.

On December 30, 2024, the NRC published a final rule (89 FR 106234) amending its regulations that govern the license renewal process for certain production or utilization facilities ("the NPUF rule").[10] As part of this rulemaking, the Commission revised several definitions related to the licensing of non-power production or utilization facilities (NPUFs).[11]

The NPUF rule tied the use of non-power reactor to be used for commercial and industrial purposes if it can demonstrate that it meets a performance-based 1 rem total effective dose equivalent (TEDE) accident criteria set forth in 10 CFR 50.34(a)(1)(i). The following quote from Federal Register Notice (FRN) publishing the NPUF rule summarizes the change:

> This final rule also revises the definition of *Non-power reactor* to distinguish between non-power reactors used for research and development activities and non-power reactors used for commercial or industrial purposes. Before this final rule, all non-power reactors were defined in § 50.2 as "a research or test reactor licensed under §§ 50.21(c) or 50.22 of this part for research and development." This final rule defines non-power reactors more precisely as one of three mutually exclusive categories of facilities:
>
> 1) testing facilities,[12]
> 2) research reactors that are NPUFs licensed under § 50.21(c), or
> 3) commercial or industrial reactors that are NPUFs licensed under § 50.22.
>
> The second and third categories exclude testing facilities, and the facilities in those categories must meet the accident dose criterion in § 50.34(a)(1)(i).[13] If they do not meet this criterion, then they will be considered testing facilities.

As revised by the NPUF rule, 10 CFR 50.34(a)(1)(i) states, in part:

> For non-power production or utilization facilities not subject to 10 CFR part 100, the assessment must provide an evaluation of the applicable radiological consequences that demonstrates with reasonable assurance that any individual located in the unrestricted area following the onset of a

[9] https://www.federalregister.gov/documents/2024/12/30/2024-30721/non-power-production-or-utilization-facility-license-renewal
[10] Ibid.
[11] https://www.nrc.gov/docs/ML2424/ML24248A208.html
[12] Testing facilities was revised in the NPUF rule.
[13] https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0034.html

> postulated accident, including consideration of experiments, would not receive a radiation dose in excess of 1 rem (0.01 Sv) TEDE for the duration of the accident.[14]

As previously discussed, the NRC uses the terms power reactor and non-power reactor when delineating differing regulatory requirements. The NPUF rule discusses the differences:

> First, compared to power reactors, the NPUFs licensed under § 50.21(a) or (c), other than testing facilities, operate at low power levels, temperatures, and pressures, and have a small inventory of fission products in the fuel. Therefore, these NPUFs present a lower potential radiological risk to the environment and the public. Additionally, the consequences of the maximum hypothetical accidents (MHAs) for these facilities fall below the standards in 10 CFR part 20 for protecting the health and safety of the public.

The NPUF rule sets forth a specific risk profile for a commercial non-power reactor. The same risk profile should be used to allow reactors that produce electrical or heat energy to utilize the commercial non-power reactor licensing framework, provided that the facility meets the dose accident criteria in 10 CFR 50.34(a)(1)(i). This dose-based requirement aligns with current Congressional direction in the *Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act*[15] and the *Nuclear Energy Innovation and Modernization Act*[16] for the NRC to improve the use of risk-informed and performance-based regulatory frameworks, versus historical frameworks that may be based on other criteria.

In practice, a commercial non-power reactor would have a level of regulation applied to their licensing and oversight commensurate with the safety and risk implications of the facility instead of based on the 10 CFR 50.22 financial criteria. Commercial non-power reactor reactors can use the appropriate guidance in NUREG-1537 due to their risk profile. Furthermore, existing power reactor regulations located in 10 CFR would not apply to commercial non-power reactors. Examples include quality assurance program, specific fire protection, human factors, and PRA requirements that impose a level of burden for meeting safety requirements well beyond a level commensurate with the facility's risk profile.

Recommendations

The NPUF rule created the potential for a new approach to regulate new nuclear technologies with low risks to public health and safety. The definition of non-power reactor created in the NPUF rule links the facility designation to its risk profile and clarifies that NPUFs can include both AEA Section 103 and Section 104 licensees. However, the definition of NPUF keeps the artificial distinction between power reactor and non-power reactor that has no basis in the AEA and should be removed from the regulations as both out-of-date and contrary to risk-informed regulation.

---

[14] Footnote 2 in 10 CFR 50.34(a)(1)(i) states: "The 1 rem accident dose criterion for non-power production or utilization facilities is not a dose limit; it informs the analysis of postulated accidents and the development of safety measures so that in the unlikely event of an accident, the NRC has reasonable assurance that no acute radiation-related harm will result to any member of the public."
[15] https://www.epw.senate.gov/public/index.cfm/2024/7/signed-bipartisan-advance-act-to-boost-nuclear-energy-now-law
[16] https://www.congress.gov/bill/115th-congress/senate-bill/512

In order to address any potential issues that may limit implementation of the approaches described in this enclosure, the NRC should initiate multiple, rapid pilots to determine how the NRC can issue a Class 103 license for a commercial non-power reactor under its existing regulatory framework using plant-specific application guidance and (if necessary) exemptions or a rule of particular applicability. These pilots should be initiated and completed as soon as possible to demonstrate the viability of this new licensing pathway. Additionally, the NRC should also consider how to clarify the arbitrary distinctions between license classes and reactor type definitions. While any such clarifications are unnecessary based on the NPUF rule, clarification may provide additional certainty to future applicants.

At a minimum, any pilot should consider the following items to remove any confusion or misunderstanding regarding definitions in different Parts of the CFR.

- Address any potential confusion within the NPUF definition. The NRC staff have contemplated the concept of a commercial non-power reactor.[17] However, the NPUF definition says "not a power reactor," which is confusing with the revised definition of non-power reactor that is licensed under 10 CFR 50.22 for commercial or industrial purposes and Section 103 of the AEA.
- Determine how to license a commercial non-power reactor reactor under 10 CFR Part 52. The existing regulatory requirements and process in 10 CFR Part 52 are only applicable to power reactors or nuclear power facilities. Both terms are undefined in 10 CFR Part 52[18] and this could be an area that requires clarity regarding the need for an exemption.
- Address any complications arising from the definitions of power reactor in 10 CFR 170.3 and 10 CFR 171.5. Specifically, the definitions of power reactor in these sections do not envision licensing of a Class 103 commercial non-power reactor under 10 CFR 50.22.
- Align the dose requirements. Meeting 10 CFR 50.34(a)(1)(i) requires demonstrating that any individual located in the unrestricted area following the onset of a postulated accident, including consideration of experiments, would not receive a radiation dose in excess of 1 rem (0.01 Sv) TEDE for the duration of the accident. This closely aligns with the NRC's Emergency Preparedness for Small Modular Reactors and Other New Technologies rulemaking ("EP rule").[19] In particular, the EP rule uses "10 millisieverts (mSv) (1 rem) total effective dose equivalent (TEDE) over 96 hours". Ultimately, the 1-rem site-boundary dose consequence is an agreed upon figure of merit for reduced regulatory burden. The NRC should determine how an applicant could meet both of these targets.

[17] https://www.nrc.gov/docs/ML2433/ML24330A230.pdf
[18] https://www.nrc.gov/reading-rm/doc-collections/cfr/part052/full-text.html
[19] https://www.federalregister.gov/documents/2023/11/16/2023-25163/emergency-preparedness-for-small-modular-reactors-and-other-new-technologies