RULEMAKING ISSUE
(Notation Vote)

November 29, 2021 SECY-21-0098

FOR: The Commissioners

FROM: Daniel H. Dorman
Executive Director for Operations

SUBJECT: PROPOSED RULE: ADVANCED NUCLEAR REACTOR GENERIC ENVIRONMENTAL IMPACT STATEMENT (RIN 3150-AK55; NRC-2020-0101)

PURPOSE:

The purpose of this paper is to obtain Commission approval to publish in the *Federal Register* the enclosed proposed rule (Enclosure 1) that would amend Part 51 of Title 10 of the *Code of Federal Regulations* (10 CFR), "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," to codify the findings of the draft Advanced Nuclear Reactor Generic Environmental Impact Statement (ANR GEIS) (Enclosure 2). This paper addresses no new commitments.

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) staff has prepared a proposed rule that would amend the regulations that govern the NRC's environmental reviews under the National Environmental Policy Act (NEPA) by codifying the findings of the ANR GEIS. The ANR GEIS uses a technology-neutral regulatory framework and performance-based values and assumptions to determine those environmental impacts that could result in the same (generic) impact for different advanced nuclear reactor designs that fit within the parameters set forth in the ANR GEIS and those environmental impacts that would require a project-specific analysis.

Enclosure 4 transmitted herewith contains Official Use Only – Sensitive Internal Information. When separated from Enclosure 4 this transmittal document is decontrolled.

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If an applicant for an advanced nuclear reactor permit or license appropriately relied upon the generic findings in the ANR GEIS, as determined by the staff, then the staff's draft supplemental environmental impact statement (SEIS) prepared for the advanced nuclear reactor application would incorporate those findings. The draft SEIS would be issued for public comment in accordance with the current NRC regulations in 10 CFR Part 51. The SEIS would be considered a supplement to the ANR GEIS, and both the ANR GEIS and the final SEIS would, in concert, document the NRC's NEPA analysis with respect to the Commission's decision to either approve or disapprove the advanced nuclear reactor application.

As the generic findings of the ANR GEIS would be codified into the NRC's 10 CFR Part 51 regulations, the findings would not be subject to challenge in an individual licensing proceeding absent a waiver from the Commission. The staff expects that the proposed rule would streamline the NEPA reviews for future advanced nuclear reactor applications.

BACKGROUND:

This rulemaking is part of a broader NRC effort to prepare for licensing advanced nuclear reactors,[1] such as non-light-water reactors. In 2016, the NRC issued a report[2] with its vision and strategy to ensure technical and regulatory readiness to review and license a new generation of reactors.

In 2019, the NRC staff began exploring the viability of developing a GEIS for the construction and operation of advanced nuclear reactors. On February 28, 2020, the staff submitted a notation vote paper[3] to the Commission with the results of this activity and recommended proceeding with development of the ANR GEIS using a technology-neutral plant parameter envelope (PPE) approach to bound any reactor design with a generating output up to approximately 30 megawatts thermal (MWt) per reactor with a small site environmental footprint. Several comments received during the scoping process recommended a technology-neutral, performance-based approach rather than one relying upon a MW(t) approach. On September 21, 2020, the Commission issued a staff requirements memorandum[4] that approved the development of an ANR GEIS and directed the staff to conduct rulemaking to codify the generic findings of the ANR GEIS in the NRC's regulations. The Commission further directed that when establishing the scope of the ANR GEIS, to the extent possible, the staff should continue to consider a PPE that is inclusive of as many advanced nuclear reactor technologies as possible and to ensure that any bounding power level applied in the ANR GEIS is the result of a risk-informed and performance-based analysis that thoroughly incorporates input from

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1 The proposed rule defines the term "advanced nuclear reactor" as "a nuclear fission or fusion reactor that meets the definition of a production facility or utilization facility, as defined in § 50.2 of this chapter, including a prototype plant (as defined in §§ 50.2 and 52.1 of this chapter), with significant improvements compared to commercial nuclear reactors in operation or under construction as of January 14, 2019, as provided in section 3(1) of the Nuclear Energy Innovation and Modernization Act, Pub. L. 115-439, § 3(1), 132 Stat. 5565-66)."

2 "NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness," dated December 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16356A670).

3 SECY-20-0020, "Results of Exploratory Process for Developing a Generic Environmental Impact Statement for the Construction and Operation of Advanced Nuclear Reactors," dated February 28, 2020 (ADAMS Accession No. ML20052D029).

4 SRM-SECY-20-0020, "Staff Requirements—SECY-20-0020—Results of Exploratory Process for Developing a Generic Environmental Impact Statement for the Construction and Operation of Advanced Nuclear Reactors," dated September 21, 2020 (ADAMS Accession No. ML20265A112).

external stakeholders. Therefore, the staff used a technology-neutral, performance-based PPE approach that decoupled reactor power level from as many resource-area analyses as possible.

DISCUSSION:

Development of the ANR GEIS

Development of the ANR GEIS began in April 2020 when the NRC published a notice of intent to conduct scoping and prepare an ANR GEIS in the *Federal Register* (85 FR 24040; April 30, 2020). The scoping notice initiated a 60-day public comment period. On May 28, 2020, the NRC staff conducted a public scoping meeting to accept comments, with the intent of defining the environmental issues to be discussed in the ANR GEIS. Additionally, the NRC staff requested feedback from States and federally recognized Tribes. The staff documented the results of the scoping process in the ANR GEIS scoping summary report, issued September 2020 (ADAMS Accession No. ML20260H180). During the scoping comment period, the NRC received 3,196 comment submissions from individuals, industry representatives, a nongovernmental organization, Tribes, and a Federal agency, including form letters from 3,151 individuals. The staff analysis identified 319 unique comments during the scoping process. The staff considered all public comments and provided responses in the scoping summary report.[5]

At the time of scoping, the NRC staff considered a "small-scale" advanced nuclear reactor as one having the potential to generate up to approximately 30 MWt per unit with a correspondingly small environmental footprint. Based on the comments received during scoping, the staff expanded the use of performance-based plant parameters and assumptions that would reduce the reliance on a specified power level. Most resource areas do not need the power level to evaluate the impacts on the resource. For example, a performance-based parameter would be used to evaluate the advanced nuclear reactor's water use compared to water availability and performance assumptions (such as receiving the required water permits from other agencies).

After considering public comments, the NRC staff assessed potential environmental impacts from the construction, operation, and decommissioning of advanced nuclear reactors. Because advanced nuclear reactors are not specific to any one reactor design and could be sited anywhere in the United States that meets NRC siting requirements, the staff decided to pursue a technology-neutral approach using a PPE and site parameter envelope (SPE). The PPE consists of parameters for specific reactor design features, regardless of the site. Examples of parameters include the permanent footprint of disturbance, building height, quantity of water used, air emissions, employment levels, and noise-generation levels. Similarly, the SPE consists of parameter values (e.g., size of site, size of water bodies supplying water to the reactor, demographics) to describe the affected environment. The ANR GEIS provides the analysis evaluating the environmental impacts of a proposed reactor that fits within the bounds of the PPE on a site that fits within the bounds of the SPE. By using this approach, impact analyses for the environmental issues common to many or most advanced nuclear reactors can be addressed generically, thereby eliminating the need to repeatedly reproduce the same analyses each time a licensing application is submitted and allowing applicants and the NRC staff to focus future environmental review efforts on issues that only can be resolved once a site is identified. These benefits are consistent with the efficiency and reliability principles under the NRC's Principles of Good Regulation.

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5 Scoping Summary Report for the Advanced Nuclear Reactor Generic Environmental Impact Statement Public Scoping Period dated September 2020 (ADAMS Accession No. ML20260H180).

The staff used various sources to establish the values and assumptions, including the following:

- regulatory limits and permitting requirements relevant to the resource as established by Federal, State, or local agencies;
- relevant information obtained from other NRC GEISs, including the License Renewal GEIS[6] and the Continued Storage GEIS[7];
- empirical knowledge gained from conducting environmental reviews of new reactors;
- values and assumptions derived from other documents applying a PPE/SPE approach (such as the National Reactor Innovation Center PPE Report[8]); and
- subject matter expertise or development of calculations and formulas based upon education and experience with the resource.

The NRC has in place regulations that provide bounding assumptions for certain issues, such as Tables S-3 and S-4 (10 CFR 51.51 and 51.52) and also has codified generic environmental findings for reactor license renewals and continued spent fuel storage in the regulations. Codifying the environmental findings in the ANR GEIS through a rulemaking would streamline the NRC's licensing process by simplifying both the project-specific environmental review and the preparation of the accompanying SEIS. Further, the deliberative rulemaking process provides opportunities for public participation and supports resolution of certain generic issues provided certain criteria are met, namely, the project meeting or being bounded by the PPE and the SPE values and assumptions and a determination that there is no new and significant information.

The staff has reviewed programmatic environmental impact statements issued by other Federal agencies to determine whether any were based on a similar concept as the PPE/SPE approach in the ANR GEIS. Although the staff did not find any using the same approach, many have taken similar approaches to tiering and developing surrogates or bounding analyses.

Overview of the ANR GEIS

The NRC staff identified and analyzed 121 environmental issues arranged by resource area. The staff designated an issue as Category 1 if the staff could reach a generic finding of SMALL adverse environmental impact, or beneficial impacts, assuming certain criteria, as described above, were met. Otherwise, it designated the issue as Category 2, meaning that a project-specific analysis would be required to reach a conclusion about the environmental impact. The staff reviewed each environmental issue with the goal of generically dispositioning as many of the issues as possible within the SPE and PPE parameters that were inclusive of a variety of advanced reactor technologies. However, certain site-specific issues (e.g., Endangered Species Act or National Historic Preservation Act reviews) cannot be dispositioned

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6 NUREG-1437, Revision 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants—Final Report," dated June 2013 (ADAMS Accession No. ML13107A023).

7 NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel—Final Report," dated September 2014 (ADAMS Accession No. ML14198A440).

8 NRIC-21-ENG-0001, PNNL-30992, "Advanced Nuclear Reactor Plant Parameter Envelope and Guidance," dated February 18, 2021 (https://nric.inl.gov/wp-content/uploads/2021/02/NRIC-PPE-Guidance-Feb-2021-Final.pdf).

generically. Of the 121 environmental issues, 100 issues (over 80 percent) were Category 1, 19 issues were Category 2, and 2 issues were not assigned a category designation.[9]

In its environmental report, an applicant would be able to rely on the generic finding in the ANR GEIS for each Category 1 issue for which it can demonstrate that its project meets or is bounded by the values and assumptions for that issue, and for which there is no new and significant information that may affect those values and assumptions such that a SMALL environmental impact finding could no longer be supported. Other than demonstrating that its project meets or is bounded by a given Category 1 issue's values and assumptions, no further analysis is required for that issue. In its environmental report, however, the applicant would need to provide a project-specific analysis for Category 2 issues, and for those Category 1 issues for which the values and assumptions are not met or for which it identifies new and significant information. Similarly, in preparing its draft SEIS, the NRC staff would rely on the generic finding in the ANR GEIS for each Category 1 issue for which the applicant, as determined by the NRC staff, has demonstrated that the proposed project is bounded by that issue's values and assumptions and for which neither the applicant nor the NRC staff has identified any new and significant information. In the draft SEIS, the NRC staff would need to provide a project-specific analysis for Category 2 issues, and for those Category 1 issues for which the values and assumptions are not met or for which the applicant or the NRC staff has identified new and significant information.

The NRC staff used a technology-neutral, performance-based approach in preparing the ANR GEIS and proposed rule. As a result, there is no specific limitation on power level, and power level is not used directly for any of the 121 environmental issues discussed in the ANR GEIS. Any advanced nuclear reactor applicant could use the ANR GEIS, regardless of design or size.

Overview of Proposed Rule

The proposed rule would add a new Appendix C, consisting of a new Table C-1, to 10 CFR Part 51 that would codify the generic or Category 1 ANR GEIS findings and specify the values and assumptions that an advanced nuclear reactor applicant would need to meet to adopt the Category 1 conclusions. The table would also list the Category 2 issues. The proposed rule would add a definition of the term "advanced nuclear reactor" to the list of definitions in 10 CFR 51.14(a), revise 10 CFR 51.50, "Environmental report—construction permit, early site permit, or combined license stage," and 10 CFR 51.75, "Draft environmental impact statement—construction permit, early site permit, or combined license," and add new 10 CFR 51.96, "Final supplemental environmental impact statement—advanced nuclear reactor," to provide advanced nuclear reactor applicants and the NRC staff with directions on the use of the ANR GEIS and Table C-1. The staff intends to periodically review the ANR GEIS findings and update them, if necessary.

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[9] The staff did not assign a category designation to two issues—human health impacts from electromagnetic fields (EMFs) during construction and human health impacts from EMFs during operation—because the state of the science is currently inadequate, and no generic conclusion is possible. Studies of 60-hertz EMFs have not uncovered consistent evidence linking harmful effects with field exposures. If, in the future, the NRC finds that the appropriate Federal health agencies have reached a general agreement that there are adverse health effects from EMFs, the staff anticipates that the NRC would require applicants to submit plant-specific reviews of these health effects as part of their applications. Until such time, applicants are not required to submit information on EMFs. This approach is consistent with the NRC's GEIS for license renewal.

Implementing Guidance

The NRC staff plans to publish guidance[10] for advanced nuclear reactor applicants and interim guidance[11] for NRC staff to support the implementation of the proposed rule's requirements. These documents would be referenced in the preamble of the proposed rule and would be available for public comment along with the proposed rule and the ANR GEIS.

These documents would provide guidance on: (1) the development of environmental reports by advanced reactor applicants, (2) how applicants could demonstrate meeting the values and assumptions for each Category 1 issue in the ANR GEIS, and (3) how the NRC staff will evaluate applications that reference the ANR GEIS and develop a draft and final SEIS.

Anticipated Costs and Benefits

The NRC staff recognizes the initial resource investment needed to develop a GEIS. However, there are cost savings for each SEIS after the initial one that references the ANR GEIS. Therefore, the value of the ANR GEIS would be proportional to the number of individual advanced nuclear reactor environmental reviews that reference it. Generic determinations in an ANR GEIS would reduce the number of issues that must be fully analyzed in any individual advanced nuclear reactor environmental review. Historically, reactor environmental reviews for large light-water reactors generally exceeded 36 months. The staff's qualitative assessment, based on a 24-month schedule, estimates that use of the ANR GEIS would reduce the costs of environmental reviews for licensing advanced nuclear reactors by at least 20 percent and potentially up to 45 percent. Savings would depend on the number of issues for which the applicant, in its environmental report, and the NRC, in its draft and final SEIS, are able to adopt the generic conclusions in the ANR GEIS. A particular project might meet the values and assumptions for many of the Category 1 issues or only a few, depending on the proposed plant design and the characteristics on and around the proposed reactor facility site.

The staff prepared a draft regulatory analysis (Enclosure 3) to determine anticipated costs and benefits associated with the ANR GEIS. The regulatory analysis shows that the staff's recommendation is quantitatively cost-beneficial. Assuming eight applications over the next decade, the regulatory analysis concluded that the proposed rule alternative and associated guidance would result in undiscounted total net savings for the NRC and applicants up to $14.5 million or $2.0 million per application if the ANR GEIS is fully utilized for all Category 1 issues. Because the ANR GEIS could potentially be utilized for advanced micro-reactors, the NRC staff does not have sufficient information at this time to determine whether the proposed rule would affect any small entities as defined in 10 CFR 2.810.[12] Therefore, the NRC staff has included an initial regulatory flexibility analysis in the *Federal Register* notice and is requesting public comment on the potential impact of the proposed rule on small entities.

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10 Draft Regulatory Guide DG-4032, "Preparation of Environmental Reports for Nuclear Power Stations" (ADAMS Accession No. ML21208A120), which would be Revision 4 to Regulatory Guide 4.2.

11 COL-ISG-030, "Environmental Considerations Associated with Advanced Nuclear Reactor Applications that Reference the Generic Environmental Impact Statement (NUREG-2249)" (ADAMS Accession No. ML21227A005).

12 The Office of the Chief Financial Officer (OCFO) is finalizing a rule that would amend 10 CFR 2.810 to change the current receipt standard from $7 million to $8 million and the look back period from 3 years to 5 years. The staff will make appropriate adjustments to the proposed rule *Federal Register* notice (FRN) to reflect the rule text of 10 CFR 2.810 as it exists at the time of publication of the FRN.

The staff also determined that development of an ANR GEIS would provide significant qualitative benefits. The ANR GEIS is designed to help applicants and the NRC focus on project-specific issues rather than revisiting issues that can appropriately be considered generically. Another benefit is an increase in regulatory stability and predictability because applicants would better understand what is needed to address environmental resource areas in their advanced reactor applications. The ANR GEIS would also enhance consistency across environmental reviews for advanced nuclear reactors.

Stakeholder Engagement

Public involvement has included: (1) the publication of a notice announcing an exploratory process and opportunity for comment to determine the possible utility of developing an ANR GEIS (84 FR 62559) on November 15, 2019; (2) public meetings on November 15 and November 20, 2019, and a workshop on January 8, 2020, to gather information for the exploratory process; (3) the publication of a notice of intent to conduct scoping and prepare an ANR GEIS (85 FR 24040) on April 30, 2020; (4) a public meeting on May 28, 2020, to receive comments on the scope of the ANR GEIS; and (5) updates at periodic advanced reactor stakeholder public meetings on October 1, 2020; March 8, 2021; April 15, 2021; and July 15, 2021.

The staff received comments that supported the development of an ANR GEIS, as well as comments that opposed the concept. Commenters who supported development of an ANR GEIS stated that it would improve the efficiency of the environmental review process, would avoid duplication of effort, and would focus future reviews on important environmental issues. Commenters who did not support development of an ANR GEIS stated it would be premature at this time and that the staff did not have sufficient information available to resolve issues generically.

If the Commission approves publication of the proposed rule, the staff plans to hold one or more public meetings during the comment period and conduct additional outreach and meetings as needed.

Relationship to Other Ongoing Activities

The NRC staff is currently undertaking or planning to undertake several other rulemaking activities related to advanced nuclear reactors and the agency's NEPA process. These activities include a rulemaking to develop a risk-informed, technology-inclusive regulatory framework for advanced nuclear reactor licensing (the 10 CFR Part 53 rulemaking)[13] and the submission of a rulemaking plan[14] recommending a proposed rule to revise the NRC's 10 CFR Part 51 regulations for NEPA reviews. If the Commission approves the issuance of a 10 CFR Part 51 proposed rule, the staff expects to consolidate the interim staff guidance issued with the ANR GEIS proposed rule with a proposed update to NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan."

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13 Risk-Informed, Technology Inclusive Regulatory Framework for Advanced Reactors (Docket ID NRC-2019-0062; RIN 3150-AK31).

14 SECY-21-0001, Transforming the NRC's Environmental Review Process, (ADAMS Accession No. ML20212L389) (Docket ID NRC-2021-0029).

RECOMMENDATION:

The NRC staff recommends that the Commission approve the enclosed proposed rule (Enclosure 1) for publication in the *Federal Register*.

If the Commission approves the staff's recommendation, the NRC will complete the following activities:

- The NRC will publish the proposed rule in the *Federal Register* for a 75-day comment period. The *Federal Register* notice will also request comment on the draft ANR GEIS (Enclosure 2), the draft regulatory analysis (Enclosure 3), the draft revised guidance documents, and draft regulatory flexibility analysis.

- The NRC staff will submit the proposed information collection requirements to the Office of Management and Budget for its review and approval on or immediately after the date of publication of the proposed rule in the *Federal Register*. This proposed rule contains amended information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, et seq.).

- The Office of Congressional Affairs will inform the appropriate congressional committees.

- The NRC staff will work with the Office of Public Affairs on public communications when the NRC publishes the proposed rule in the *Federal Register*.

RESOURCES:

Enclosure 4 includes an estimate of the NRC resources needed to complete this rulemaking.

COORDINATION:

The Office of the General Counsel reviewed this package and has no legal objection. The OCFO reviewed this proposal for resource implications and has no objections.

Daniel H. Dorman Digitally signed by Daniel H. Dorman Date: 2021.11.29 16:33:37 -05'00'

Daniel H. Dorman
Executive Director
for Operations

Enclosures:
1. Proposed Rule
2. Draft Advanced Nuclear Reactor Generic Environmental Impact Statement
3. Draft Regulatory Analysis
4. Estimated Resources (Not Publicly Available)

SUBJECT: PROPOSED RULE: ADVANCED NUCLEAR REACTOR GENERIC ENVIRONMENTAL IMPACT STATEMENT (RIN 3150-AK55; NRC-2020-0101)
DATED: November 29, 2021

WITS: SRM-S20-0020-5

ADAMS Accession Nos.: ML21222A044 (pkg); SECY: ML21222A053; FRN: ML21222A054; Draft ANR GEIS: ML21222A055; Draft Regulatory Analysis: ML21222A057; Estimated Resources: ML21222A058 **SECY-012**

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