POLICY ISSUE
(Notation Vote)

January 8, 2015 SECY-15-0002

FOR: The Commissioners

FROM: Mark A. Satorius
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SUBJECT: PROPOSED UPDATES OF LICENSING POLICIES, RULES, AND GUIDANCE FOR FUTURE NEW REACTOR APPLICATIONS

PURPOSE:

This paper describes U.S. Nuclear Regulatory Commission (NRC) staff proposals to update policies, rules, and guidance to be applied to future new reactor licensing applications.

SUMMARY:

The NRC staff is proposing policy and regulatory updates to ensure consistency in new reactor licensing reviews, regardless of the licensing process an applicant chooses to use. For many years, new reactor licensing and guidance development activities have focused on the licensing processes in Title 10 of the *Code of Federal Regulations* (CFR) Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," rather than those in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities." As a result, some Commission decisions regarding new reactor licensing issues have been incorporated into 10 CFR Part 52, without similar requirements consistently being incorporated into 10 CFR Part 50. For example, 10 CFR Part 52 includes requirements derived from the Commission "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants,"[1] with explicit requirements related to the Three Mile Island items in 10 CFR 50.34(f), severe accidents,

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[1] Published in the *Federal Register* as 50 FR 32138, August 8, 1985.

probabilistic risk assessment, and other topics, without similar requirements being incorporated for new 10 CFR Part 50 power reactor applications. Therefore, the staff recommends that the Commission confirm that its policies and requirements should apply to all new power reactor applications, regardless of the selected licensing approach. The staff's proposals are intended to ensure that equivalent designs submitted for NRC review under either process are assessed against consistent technical standards that yield outcomes with equivalent demonstrations of adequate safety, security, and environmental protection.

Guidance updates are also needed to implement the Commission's direction and to ensure alignment of technical positions for review of new reactor applications. These updates need to address issues affecting new reactor licensing reviews where guidance for new 10 CFR Part 50 applications has not yet been developed, such as consideration of severe accident issues for environmental reviews and implementation of recent rule changes, including 10 CFR 50.54(hh) mitigative strategies and response procedure requirements and 10 CFR 50.150 requirements for aircraft impact assessment.

In addition, the staff proposes that 10 CFR Parts 52 and 50, and supporting regulations be revised to reflect lessons learned from recent combined license (COL), design certification, early site permit (ESP), and operating license (OL) reviews. The proposed changes will improve the clarity and effectiveness of these regulations for review of future new reactor license applications.

The NRC staff proposes that the Commission direct a coordinated rulemaking effort to address both the alignment of 10 CFR Parts 50 and 52, and the lessons learned from recent 10 CFR Part 52 licensing efforts.

BACKGROUND:

The nuclear power plants presently operating in the United States were licensed under the process described in 10 CFR Part 50. The NRC and its predecessor, the Atomic Energy Commission, approved construction of these plants between 1964 and 1978 and granted the most recent OL under 10 CFR Part 50 in 1996. The NRC applied its experience in licensing these reactors in the development of 10 CFR Part 52, which has been used for the most recent new reactor licensing reviews, including the COLs issued for new facilities at the Vogtle and Summer sites, along with new reactor design certifications and early site permits.

Regulatory Approaches in 10 CFR Parts 50 and 52[2]

Under the 10 CFR Part 50 process, a prospective nuclear power plant operator applies first for a construction permit (CP), and then for an OL. The requirements in 10 CFR 50.34(a) outline the information applicants must submit in a preliminary safety analysis report to support the NRC staff's safety review and issuance of a CP. The process for issuance of a CP includes an opportunity for the public to request a hearing, as well as an uncontested hearing. An OL

[2] A more detailed description of the 10 CFR Part 50 and 10 CFR Part 52 approaches can be found in SECY-01-0188, "Future Licensing and Inspection Readiness Assessment," October 12, 2001, Agencywide Documents Access and Management System (ADAMS) Accession No. ML012350040.

application includes a final safety analysis report, with the content specified by 10 CFR 50.34(b), which describes the licensing basis that is reviewed by the NRC staff to develop the agency's safety evaluation report. An opportunity for a hearing is provided during an OL review.

The Commission approved 10 CFR Part 52 in 1989, providing for standardized review of designs, site, and license applications for new nuclear power plants.[3] The regulations in 10 CFR Part 52 are intended to apply lessons learned from licensing the current operating reactor fleet, provide an alternative licensing process to the licensing process described in 10 CFR Part 50, and increase standardization of the next generation of nuclear power plants. Under the 10 CFR Part 52 regulatory framework, a prospective nuclear power plant operator applies for a COL that authorizes both construction and (after certain criteria are met) plant operation. The application may reference a certified design, standard design approval, manufacturing license, or an ESP to take advantage of reviews previously completed by the NRC. There is an opportunity for the public to request a hearing. An uncontested hearing is also conducted before a COL or ESP is issued, and there is an opportunity for a hearing after a COL is issued before fuel loading is authorized, limited to determining whether the acceptance criteria in the license have been met.

In addition to establishing this alternative process, the requirements in 10 CFR Part 52 formalized expectations for new designs per the Commission policy statement on severe accidents, with explicit requirements related to the Three Mile Island items in 10 CFR 50.34(f), severe accidents, probabilistic risk assessment, and other topics. However, 10 CFR Part 50 has not been updated to include similar requirements. As a result, the two licensing processes have different technical requirements, and thus may not provide the same level of safety, security, or environmental protection. Additional background on implementation of Commission policies in 10 CFR Part 52 is provided in Enclosure 1 of this paper.

Interest in the 10 CFR Part 50 Process

The NRC staff is aware that potential applicants are evaluating whether the 10 CFR Part 50 licensing process meets their business needs. For example, the Tennessee Valley Authority and NRC staff had extensive discussions regarding a proposed construction permit application for installation of Babcock & Wilcox mPower small modular reactors at the Clinch River site in Roane County, Tennessee, though those plans subsequently changed.

Potential applicants for non-light water reactor designs are also considering whether 10 CFR Part 50 is a more viable approach than 10 CFR Part 52 for a first-of-a-kind facility. During recent years, several such potential applicants have informed the staff of their intentions to use the 10 CFR Part 50 process. However, pre-application interactions are likely to commence in the near term and regulatory clarity is needed for prospective applicants' decisionmaking, and to support NRC staff planning and interactions.

Lessons Learned from Recent New Reactor Licensing Experience

Since the 2007 update to 10 CFR Part 52, the NRC staff has identified a number of items to address in a subsequent rulemaking, including corrections, clarifications, and new requirements.

[3] These regulations have been updated several times, most recently in 2007.

These items have been identified primarily as a result of 10 CFR Part 52 licensing reviews conducted by the NRC staff since 2007. This effort has also identified potentially beneficial changes to other parts of the regulations, including but not limited to 10 CFR Part 21, "Reporting of Defects and Noncompliance," 10 CFR Part 73, "Physical Protection of Plants and Materials," and 10 CFR Part 100, "Reactor Site Criteria." The NRC staff believes that such a rulemaking would provide further clarity and consistency to the 10 CFR Part 52 licensing processes and would benefit both potential future applicants in developing license applications and the NRC staff during review of those applications. In 2012, the NRC staff initiated efforts to develop a regulatory basis for this rulemaking. This work ended after about 6 months, because funding was provided only for higher priority rulemaking activities. Subsequently, the staff completed a report, "New Reactor Licensing Process Lessons Learned Review: 10 CFR Part 52."[4] This report identifies seven lessons, including the benefit of regulatory updates (i.e., rulemaking) to make new reactor licensing processes more effective and efficient, noting that the staff has been gathering information to support updating 10 CFR Part 52 over the past several years.

Enclosure 2 provides additional discussion of the new reactor licensing lessons learned rulemaking.

DISCUSSION:

Alignment of New Reactor Licensing Policies

The NRC staff is recommending that the Commission confirm that certain policies applied to review of 10 CFR Part 52 license applications, such as severe accident policies, also apply to review of new 10 CFR Part 50 license applications. Because of the NRC and industry focus on the 10 CFR Part 52 licensing process in recent years, some policy decisions have been addressed only in the context of 10 CFR Part 52 applications. Specifically, the staff recommends that the Commission confirm that the "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants," and other Commission direction given in response to SECY-89-013, "Design Requirements Related to the Evolutionary Advanced Light Water Reactors," dated January 19, 1989;[5] SECY-90-016, "Evolutionary Light Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements," dated January 12, 1990;[6] and SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs," dated April 2, 1993;[7] apply to new 10 CFR Part 50 power reactor applications in a manner consistent with 10 CFR Part 52 design and license applications.

Enclosure 1 to this paper provides additional details regarding the policies that have been incorporated in 10 CFR Part 52 licensing reviews that also appear to be relevant to new 10 CFR Part 50 license reviews. The NRC staff is requesting Commission confirmation that these policies should also be applied to 10 CFR Part 50 application reviews.

[4] April 2013, ADAMS Accession No. ML13059A239.
[5] ADAMS Accession No. ML003707947.
[6] ADAMS Accession No. ML003707849.
[7] ADAMS Accession No. ML003708021.

Confirming that these policies also apply to 10 CFR Part 50 applications will improve the alignment between the NRC's new reactor licensing processes, ensuring that equivalent outcomes are obtained, regardless of which new reactor licensing process is used. Equivalent designs submitted for NRC review under either process should be assessed against consistent technical standards that yield outcomes with equivalent demonstrations of adequate safety, security, and environmental protection.

Improving alignment between 10 CFR Part 50 and 10 CFR Part 52 can assist prospective applicants in making decisions regarding which licensing process is best suited to their business plans. For example, prospective applicants may see 10 CFR Part 50 as a desirable alternative to 10 CFR Part 52, depending on the scope and number of changes to first-of-a-kind combined licenses during construction, including challenges in developing and processing any necessary license amendments. The proposed improvements would also assist other stakeholders, such as reactor designers and members of the public, in understanding how the NRC's requirements will be applied.

Rulemaking to Update New Reactor Licensing Regulations

The NRC staff proposes to conduct a rulemaking effort to update new reactor licensing regulations. This rulemaking would:

1. Improve alignment between the new reactor licensing processes in 10 CFR Parts 50 and 52, including implementation of the policy decisions described above and in Enclosure 1. Examples include requirements for submittal of probabilistic risk assessment information and approaches for addressing severe accidents. These proposed changes help ensure consistent safety standards are applied, regardless of the process used to license a new reactor.

2. Update 10 CFR Part 52 and supporting regulations, including 10 CFR Part 50, to address lessons learned from recent new reactor license reviews. These proposed enhancements are further described in Enclosure 2.

Processing these proposed changes as part of a single rulemaking effort will be more efficient than separate and independent rulemakings, and can help ensure continuity and consistency between new reactor licensing regulations as the changes are made. A single rulemaking effort also makes it easier for stakeholders to understand all the changes and provide meaningful input.

Alternatives to the recommendation for a single coordinated rulemaking effort are to conduct the two separate rulemakings, to pursue only one of the two proposed efforts, or to not conduct any rulemaking. Conducting the rulemakings separately would result in additional effort to process a second rulemaking, increases the possibility of inconsistency between the efforts, and complicates stakeholder understanding of the separate efforts. If the lessons learned rulemaking is not pursued, the experience gained in recent 10 CFR Part 52 licensing efforts will not be fully incorporated into that regulatory scheme. If rulemaking to improve alignment between 10 CFR Parts 50 and 52 is not pursued, there will be less clarity regarding the standards and processes to be applied to a new 10 CFR Part 50 license application, along with incremental costs and regulatory uncertainty as topics are addressed in an ad hoc manner for

new 10 CFR Part 50 licenses. If neither rulemaking is authorized, both negative effects would be experienced. Therefore, the staff believes that the greatest regulatory clarity, openness, effectiveness, and efficiency would be obtained by conducting the proposed rulemakings in a single coordinated effort.

Specific proposed rule changes to address the alignment of the 10 CFR Part 50 and 52 processes and the lessons learned from 10 CFR Part 52 licensing activities will be developed if the Commission approves the proposed rulemaking effort. The Commission and other stakeholders will be informed of details of specific proposed rule changes in accordance with the NRC's standard rulemaking practices, including opportunities for public comment. As the effort proceeds, the NRC staff may identify additional topics that may fall within the scope of the alignment or lessons learned. The Commission will also be informed if any new policy issues are identified during the rulemaking effort.

The staff considered alternatives to the proposed 10 CFR Part 50 rule changes, such as orders or license conditions, but have concluded these alternatives are not practical. The basis for this conclusion is described in the "Proposed Implementation Approach" section of Enclosure 1.

Relationship to Current 10 CFR Part 50 Operating Reactor and New Reactor Licensing Activities, and New Non-power Reactor Licensing

The proposals described in this paper do not affect the approach for NRC staff review of the Watts Bar Nuclear Plant Unit 2 or Bellefonte Nuclear Plant Units 1 and 2 operating license applications, which have already been the subject of interactions between the NRC staff and the Commission.

The proposals in this paper are also not expected to change requirements for existing operating reactors. If the proposed rulemaking proceeds, proposed rules would be reviewed to assure that no unintended consequences are imposed upon either existing operating reactors, or in nonpower reactor or utilization facility licensing requirements (medical isotope production facilities are being reviewed under 10 CFR Part 50).

Other Potential 10 CFR Part 50 License Applications

In the event that additional 10 CFR Part 50 license applications are proposed, the NRC staff will determine if additional rulemaking and guidance updates are needed based on the type of facility and the applicant's planned licensing approach. For example, proposals for new non-light water reactor licenses might require regulatory and guidance changes beyond what would be needed for new light water reactor applications.

If a 10 CFR Part 50 license application is anticipated before the proposed rule changes have been made, the NRC staff will develop recommendations for the Commission, dependent on the expected circumstances, such as reactor type and location.

RECOMMENDATIONS:

The NRC staff recommends that the Commission:

1. Confirm that the Commission's guidance given in the "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants" and other Commission direction provided in response to SECY-89-013, SECY-90-016, and SECY-93-087, apply to new 10 CFR Part 50 power reactor applications in a manner consistent with 10 CFR Part 52 design and license applications.

2. Direct the NRC staff to revise the regulations in 10 CFR Part 50 for new power reactor applications to more closely align with requirements in 10 CFR Part 52, incorporating requirements as follows:
   a. Develop a plant-specific probabilistic risk assessment, submit appropriate information describing that analysis as part of the construction permit and operating license submittals, and maintain and upgrade the probabilistic risk assessment throughout the duration of the operating license.
   b. Address the Three Mile Island requirements of 10 CFR 50.34(f), with the same exceptions given for 10 CFR Part 52 applications.
   c. Provide a description of design features for prevention and mitigation of severe accidents.
   d. Provide a description and analyses of fire protection design features and describe fire protection plans.

3. Direct the NRC staff to revise 10 CFR Part 52 and supporting regulations, including 10 CFR Part 50, to reflect lessons learned from recent new reactor licensing activities.

4. Conduct the rulemakings described in items 2 and 3 as a single coordinated effort.

The NRC staff recommends that the Commission direct the staff to conduct a rulemaking effort to support implementation of these policies, as necessary. The recommended rulemaking effort would also improve alignment between the new reactor licensing requirements in 10 CFR Part 50 with the requirements of 10 CFR Part 52 as described in Enclosure 1, and resume work on a rulemaking to reflect lessons learned from recent new reactor licensing experience as described in Enclosure 2. Near term initiation of this effort will facilitate completing rulemaking in a timely manner to inform prospective applicants' decisions and support future new reactor licensing applications.

RESOURCES:

Resource requirements are addressed in Enclosure 3.

COORDINATION:

This paper has been coordinated with the Office of the General Counsel, which has no legal objection. The Office of the Chief Financial Officer has reviewed this paper for resource implications and has no objections.

/RA/

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Enclosures:
1. Improving Alignment Between New Reactor Licensing Processes
2. 10 CFR Part 52 New Reactor Licensing Lessons Learned Rulemaking
3. Projected Resource Requirements

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