UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

May 22, 2014

The Honorable Allison M. Macfarlane
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: SECY-14-0016, "ONGOING STAFF ACTIVITIES TO ASSESS REGULATORY CONSIDERATIONS FOR POWER REACTOR SUBSEQUENT LICENSE RENEWAL"

Dear Chairman Macfarlane:

During the 614th meeting of the Advisory Committee on Reactor Safeguards, May 8-10, 2014, we completed our review of SECY-14-0016, "Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal." Our combined subcommittees on Plant License Renewal and Reliability and Probabilistic Risk Assessment also reviewed this matter during a meeting on April 8, 2014. During these reviews, we had the benefit of discussions with representatives of the NRC staff and representatives from the Department of Energy, Electric Power Research Institute, and Nuclear Energy Institute. We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. Option 1 of SECY-14-0016 is the appropriate option for subsequent license renewal (SLR). It maintains a well understood process for life extension and it preserves regulatory lessons learned.

2. The present actions to update and maintain as current the Generic Aging Lessons Learned (GALL) and Aging Management Programs (AMPs) provide the technical basis for acceptability of Option 1.

3. NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," once updated for current industry experience, evolving research, and lessons learned, is the appropriate supporting guidance for SLR. It will provide the required guidance for updating of the AMPs.

4. Design basis validation is important for SLR, both to confirm the validity of the design and licensing bases as well as the siting assumptions that may need revision. The design basis of operating plants can be validated using existing regulatory tools. The design basis of operating plants whose siting assumptions need revision should be assessed through the Fukushima related actions.

5. Use of risk assessment techniques is desirable to assess active and passive systems, structures, and components (SSCs) for internal and external vulnerabilities.

BACKGROUND

Licensees have begun to approach the NRC regarding planned applications for approval of a request for SLR – that is, approval for an additional 20 years of operation beyond a previously approved 20 year extension. This emergent environment requires regulatory and technical consideration of plant operations that will now be extended to 80 years of operation from the date of the original operating license. Recognizing this current challenge, the staff prepared SECY-14-0016, "Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal," to examine potential changes to the license renewal regulations in 10 CFR Part 54 and request Commission guidance on a path forward.

In its March 20, 2014 Staff Requirements Memorandum, the Commission directed us to work with the staff and provide our views on this matter by May 31, 2014.

DISCUSSION

The four options in SECY-14-0016 range from taking no additional regulatory action to instituting rulemaking. The staff does not propose to change the fundamentals provided in the current license renewal rule. The four options are:

Option 1: No change to the existing 10 CFR Part 54 regulations. Option 1 recommends leaving the regulations as status quo with enhancements to existing license renewal tools and guidance, including NUREG-1801, "Generic Aging Lessons Learned (GALL) Report."

Option 2: Make minor clarifications to existing 10 CFR Part 54 regulations for current and subsequent renewals.

Option 3: Update 10 CFR Part 54 regulations for current and subsequent renewals to include equipment associated with 10 CFR 50.54(hh)(2), equipment required for proposed strategies to address lessons learned from the Fukushima accident, and the Option 2 clarifications.

Option 4: Extend 10 CFR Part 54 regulations to include changes that apply specifically to SLR. Option 4 includes Option 2 and 3 changes in addition to rulemaking that addresses AMP enhancements, licensee reporting requirements, and limiting the time for SLR applications.

Consideration of the SECY Options

The SECY communicates:

> "Option 1 leaves unchanged the regulations that have provided thorough and successful license renewal for 73 plants. The advantage of Option 1 is that it provides for the least change in the current process. Technical issues related to subsequent renewal would be addressed through revisions of guidance such as the GALL Report and the SRP-LR. The disadvantage of Option 1 is that it provides a less efficient regulatory framework for the review of subsequent license renewal applications."

Option 1 is the appropriate approach for SLRs. The regulatory tools and guidance, specifically the actions by the staff to update the GALL report and the actions by licensees to update and maintain as current their AMPs, are in place and provide the technical basis for this approach. The current process for license renewal is used-and-useful and is well understood by both the staff and licensees. The benefit of processes that have proven successful for many license renewals is the constancy of purpose that avoids unwanted or unintended outcomes often associated with new and unproven processes. SLR can be achieved through the current regulatory framework.

Regulatory and Process Issues

Our discussions with the staff and stakeholders reinforced our focus on three major topical areas that are further described below.

GALL Report

The fundamental technical issues that need to be addressed and resolved prior to entering the SLR period of extended operation can be achieved through updating and strengthening the guidance in the GALL report. That guidance, and NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," should be updated for SLR. The GALL report, once updated for current industry experience, evolving research, and lessons learned, will provide the appropriate supporting guidance for SLR. We did not identify a need to create separate and unique guidance documents for SLR.

In our discussions with the staff and industry representatives, we were impressed by their dedication to ensure the GALL report is updated in a timely and accurate manner, and we are encouraged by their commitment to ensure the GALL report is ready for SLR applications.

Aging Management Programs

Completion of actions to ensure that a licensee's AMPs address the full range of technical issues presented by the period of extended operation is essential. The licensee should, where operating experience and new data dictate, modify or strengthen existing AMPs. We are aware of several AMPs that may require further research. This research may discover critical issues

that may result in further changes to the GALL report and to the AMPs. New programs may be needed to manage aging issues associated with the period of extended operation. The licensees must ensure that the supporting AMP documents are updated at a regular interval and are maintained current and accurate with respect to present science and operating experience. Actions to achieve this may include reporting of age-related degradation and notification to the NRC of certain changes in their aging management programs.

Design Basis Validation

Design basis validation is important for subsequent license renewal, both to confirm the validity of the design and licensing bases as well as the siting assumptions that may need revision. The design basis of operating plants can be validated using existing regulatory tools. The design basis of operating plants whose siting assumptions need revision should be assessed through the Fukushima related actions.

Plant Configuration Changes

One consideration for design basis validation is that the actions required to validate the design basis will discover whether, in the course of the prior 60 years of operation, the licensee has preserved its design and licensing basis, or has so altered its facility either under its 10 CFR 50.59 process or under an alternate change process, that the facility is no longer in compliance with its current design and licensing basis. Aggregate changes to the facility may have resulted in a plant configuration that is not in accordance with the facility's current design and licensing basis. We encourage validation of design and licensing bases using the present regulatory processes available to the Commission.

Site Characteristic Changes

Another consideration is whether the siting assumptions (i.e., meteorological, hydrological, and seismic) utilized originally to locate and license the facility are unchanged or have changed in the intervening 60 years of plant operations. The acceptability of the current design and licensing basis of the facility against the now-recognized changed siting assumptions should be confirmed. This should be accomplished through the Fukushima related actions.

Importantly, we recognize that the Fukushima changes may require licensees to perform periodic updates of seismic and flooding characteristics as has already been proposed as part of the Near Term Task Force (NTTF) recommendations. As we understand the Fukushima initiatives, updates would apply to all plants and would occur at a proposed frequency on the order of 10 years. We would like to be fully confident this action will occur.

Applicability of PRA to Subsequent License Renewal

Use of risk assessment techniques is desirable to assess active and passive SSCs for internal and external vulnerabilities. Current regulations require a new plant licensed under 10 CFR Part 52 to create and maintain current a PRA, while a plant designed and constructed under 10

CFR Part 50 decades earlier is not subject to that same requirement. This is a policy issue that should be addressed by the Commission and is not an issue that should be resolved specifically as part of SLR. One appropriate method to resolve this is in the context of either the Risk Management Task Force (RMTF) recommendations or in NTTF Recommendation 1.

Technical Issues

We plan to engage the staff and stakeholders in the near future to better understand the technical issues that pertain to SLR, the basis for their identification and prioritization, the status and results of on-going research, and how that information will be included in the regulatory guidance.

We look forward to continuing our interactions with the staff and stakeholders to examine relevant technical issues and their proposed management as we approach the first SLR application.

Additional comments by ACRS Members John W. Stetkar, Ronald G. Ballinger, Dennis C. Bley, Michael L. Corradini, Michael T. Ryan, and Stephen P. Schultz are provided below.

Sincerely,

/RA/

John W. Stetkar
Chairman

Additional comments by ACRS Members John W. Stetkar, Ronald G. Ballinger, Dennis C. Bley, Michael L. Corradini, Michael T. Ryan, and Stephen P. Schultz

The non-concurrence to SECY-14-0016 raises an important issue for consideration by the Commission. The 1995 Commission policy statement on "Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities" notes that:

> *The Commission believes that an overall policy on the use of PRA methods in nuclear regulatory activities should be established so that the many potential applications of PRA can be implemented in a consistent and predictable manner that would promote regulatory stability and efficiency. In addition, the Commission believes that the use of PRA technology in NRC regulatory activities should be increased to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach.*

This policy has been implemented in the regulatory requirements for new reactors that are licensed under 10 CFR Part 52. Before the initial core fuel is loaded, each new reactor licensee

must develop a plant-specific Level 2 probabilistic risk assessment (PRA) that includes internal events, internal plant hazards, and external events for all plant operating modes, consistent with NRC-endorsed consensus standards that are in effect one year prior to fuel load. Paragraphs (h)(2) and (h)(3) of 10 CFR 50.71 further require that the PRA must be upgraded every four years for consistency with evolving standards. When the licensee submits an application for a renewed license, the PRA must cover all initiating events and operating modes.

The original rulemaking for 10 CFR Part 54 and the associated Commission deliberations also date back more than 20 years. Our understanding of risk assessment technology and the benefits from an integrated risk-informed perspective of nuclear power plant safety have evolved substantially over the last two decades. Therefore, the fact that the regulations in 10 CFR Part 54 do not currently require use of risk information does not necessarily prescribe continuation of that practice in the future.

In 2045, the Commission policy statement on PRA will mark its 50-year anniversary. The first new reactors licensed under 10 CFR Part 52 will be past the mid-point of their first 40 years of operation. Other new reactors may have been licensed under 10 CFR Part 50. Some currently operating reactors may be in their period of extended operation beyond 60 years. By that time in our long history of nuclear power operation, it is incongruous that licensees and regulators would not benefit from consistent use of the risk information afforded by full-scope plant-specific PRAs for the entire fleet of operating reactors.

It has been noted that a requirement for PRAs may not be justified within the focused context of proposed changes to the regulations for subsequent license renewal. We agree with that assessment, but not with its premise. It is often argued that resources needed to extend the scope and detail of existing PRAs for currently operating reactors cannot be justified by the expected benefits from risk-informed applications that address a single issue. As noted in the 1995 Commission policy statement, there are many potential applications that would benefit from an integrated understanding of plant-specific risk. In fact, that integrated risk-informed perspective is the most fundamental benefit from the PRA process. Therefore, piecemeal assessments of potential costs and benefits for isolated issues seem contrary to the Commission's intent for the use of risk information throughout the regulatory process.

There is also a danger that the discussion about use of risk information in the context of subsequent license renewal will focus too narrowly on issues that are related directly to quantification of age-related degradation of passive plant features, such as piping, reactor materials, and concrete. While PRA methods are capable of evaluating those issues, they are not typically included explicitly in the scope of current risk models. Substantial uncertainties apply to the supporting analytical methods and data. The pitfall of isolating the discussion to those narrow subjects is that it further erodes a more comprehensive plant-specific risk-informed perspective for all aging management programs. The subsequent license renewal process would benefit from a more fully integrated treatment of that risk information. For

example, plant-specific risk information can be used to prioritize "important to safety" SSCs for treatment under the aging management programs, to optimize periodic sampling and inspection activities, to better support the analyses of Severe Accident Mitigation Alternatives, and to evaluate the significance of evolving operating experience. Plant-specific risk importance measures and risk-informed sensitivity analyses can provide important insights about the remaining safety margins if degradation is observed. Clarification of consistent expectations for PRA scope, technical quality, and reviews would reduce variability in those supporting analyses.

We strongly endorse the use of risk information to support the management of aging throughout the entire fleet of operating reactors. The Commission is currently considering an evolutionary transition to a more integrated risk-informed regulatory framework in accordance with NTTF Recommendation 1 and the recommendations of the Risk Management Task Force in NUREG-2150. Separate PRA requirements in 10 CFR Part 54 would be redundant to those broader regulatory efforts, and they could inadvertently diverge from other risk-informed initiatives. The vision of the Commission's PRA policy statement is best served by maintaining a broad perspective.

REFERENCES

1. SECY-14-0016, Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal, dated January 31, 2014 (ML13210A206).

2. SRM M140307, Staff Requirements – Meeting with the Advisory Committee on Reactor Safeguards, 10:00 A.M., Friday, March 7, 2014, Commissioners' Conference Room, One White Flint North, Rockville, Maryland, dated March 20, 2014

3. "Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; Final Policy Statement," 60 FR 42622 (August 16, 1995).

4. "Maintenance of Records, Making of Reports," 10 CFR 50.71, Paragraphs (h)(1), (h)(2), and (h)(3).

5. "Combined License Applications for Nuclear Power Plants (LWR Edition)," Regulatory Guide 1.206, June 2007.

6. US Nuclear Regulatory Commission, "Generic Aging Lessons Learned (GALL) Report," NUREG-1801, Revision 2, December 2010 (ML103490041)

7. US Nuclear Regulatory Commission, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," NUREG-1800, Revision 2, December 2010 (ML103490036)

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