



Meeting to Discuss NRC Endorsement of the Advanced Non-LWR PRA Standard and PRA Peer Review Guidance

October 26, 2020

Agenda



- 1:00 – 1:20pm Endorsement status
- 1:20 – 2:10pm Issues the NRC anticipates having to consider in developing the staff position/endorsement
- 2:10 – 2:40pm Peer review guidance (NEI 20-09)
- 2:40 – 2:45pm Next steps
- 2:45 – 3:00pm Q and A



ASME/ANS Advanced Non-LWR PRA Standard Endorsement Status

Michelle Gonzalez, RES

October 26, 2020

Objectives

- Discuss plans for endorsement of the Advanced Non-LWR (ANLWR) PRA Standard
- Provide an update on the NRC efforts for endorsement of the ANLWR PRA Standard
- Provide updated schedule for endorsement

Endorsement Plan



- Standard development support
 - NRC staff member provides support to the standard development working group
 - Initial review and ballot comments submitted on May 22, 2020
 - Recirculation ballot review/comments submitted on August 20, 2020
 - Unanimous consensus achieved following recirculation ballot
- Preparation for review and endorsement of the ANLWR PRA standard and NEI's peer review guidance
 - Options for endorsement include a final RG, a trial-use RG, or interim staff guidance (ISG)
 - Staff is consulting with NRC management and OGC to select the best option

Preparation for Review and Endorsement of the ANLWR PRA Standard



- Determine the scope of regulatory activities for the ANLWR PRA standard - complete
- Identify the needed technical expertise to review the ANLWR PRA standard for endorsement - complete
- Detailed guidance for staff review of the ANLWR PRA standard for endorsement
- Comparison of the ANLWR PRA standard to other related standards and guidance
- Develop the staff position for an acceptable ANLWR PRA
 - ♦ Early communication of staff views and perspectives
- Identify and resolve technical and policy issues

Scope of Regulatory Activities



- Staff endorsement will address acceptability of base PRAs for all licensing stages under Part 52 (DC, COL, fuel-load, and operations) and Part 50 (CP, OL) including license applications that implement the LMP guidance (NEI 18-04, Rev. 1 as endorsed in RG 1.233)
- Staff endorsement will provide clarifications and qualifications to address NRC recirculation ballot comments marked as “deferable,” which generally involve regulatory implementation issues

Ongoing Work

- Comparison of the ANLWR PRA standard to other related LWR PRA standards
- Development of draft regulatory guidance
 - ♦ Options: issue as trial use RG or final RG or ISG
- Engagement with internal stakeholders (management, OGC, ACRS)
- Engagement with external stakeholders (public, potential applicants)

Regulatory Guide Structure



A. INTRODUCTION

B. DISCUSSION

- Background
- Consideration of International Standards
- Documents Discussed in Staff Regulatory Guidance

C. STAFF REGULATORY GUIDANCE

- An Acceptable Base PRA
- National Consensus Standards and Industry PRA Programs
- Demonstrating the Acceptability of a PRA Used to Support an Application
- Documentation to Support a Regulatory Decision

D. IMPLEMENTATION

APPENDIX A - NRC REGULATORY POSITION ON THE STANDARD

APPENDIX B - PRA MAINTENANCE AND UPGRADE

APPENDIX C - NEI 20-09 ENDORSEMENT

Public Engagement and Endorsement Schedule



- Upcoming meetings
 - ACRS Meeting – November 2, 2020
 - Next public meeting being planned for January 2021
 - Every 2-3 months thereafter
 - ANLWR Stakeholder NRC meetings
- Planned endorsement schedule (if issuing draft/final RG is preferred)
 - Draft Guidance – December 2021
 - Public Comment – December 2021 through March 2022
 - Final RG published – December 2022



Non-LWR PRA-Related Areas Currently Under Staff Consideration

Hanh Phan, NRR

October 26, 2020

PRA-Related Areas Under Consideration



Staff to provide and confirm its position on the following areas prior to issuance of the final endorsement RG:

1. PRA standard supporting requirements for internal/external hazards during LPSD (fire, floods, winds, etc.)
2. Seismic margins analysis vs. seismic PRA
3. Endorsement of ASME/ANS non-LWR PRA standard, Section 2 “Acronyms and Definition”
4. Endorsement of non-mandatory appendices
5. Risk-significance measures, reporting of absolute risk and relative risk

PRA-Related Areas Under Consideration (cont'd)



6. PRA peer review guidance and expectation including the need for peer reviews to reassess compliance with high-level requirements and supporting requirements as the design and PRA evolves
7. PRA capability category for applications
8. Commencement of PRA maintenance
9. Quality assurance requirements of 10 CFR Part 50, Appendix B
10. How to “right-size” the PRA effort for microreactors
11. Others?



ANLWR PRA Acceptability Paradigm

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October 26, 2020

LWR PRA Acceptability Paradigm



Each element depends on the other in order to demonstrate PRA acceptability

This paradigm obviates the need for an in-depth staff review of the base PRA model

The PRA Acceptability Paradigm is Changing for Advanced Non-LWRs



ANLWR PRA

Acceptability Paradigm



- Similar to the existing paradigm for PRA acceptability in that peer reviews of ANLWR PRAs will help provide confidence in the acceptability of the PRA
- Because of the increased reliance on PRA, in the near-term, peer reviews can *reduce* the need for in-depth reviews of a submittal PRA
- NRC staff may still perform some in-depth reviews/audits of ANLWR PRAs in order to gain experience with:
 - ♦ reviewing new submittals
 - ♦ new reactor technologies



NRC Staff's Observations on NEI 20-09, Rev. 0, “Performance of PRA Peer Reviews Using the ASME/ANS Advanced Non-LWR PRA Standard”

Hanh Phan, NRR
Shilp Vasavada, NRR

October 26, 2020

Staff's Review of NEI 20-09

- NRC staff received NEI 20-09, “Performance of PRA Peer Reviews Using the ASME/ANS Advanced Non-LWR Standard” on June 1, 2020
- Staff reviewed and provided initial observations during a public meeting on July 22, 2020
- Staff received a revision to NEI 20-09 on August 24, 2020
- Staff has additional comments on NEI 20-09 and NEI’s ANLWR roadmap

Purpose and Expectation of the Peer Review Process



- Provide a consistent and uniform method for establishing the technical adequacy of a PRA (NEI 20-09)
- Provide a means for identifying, over time, areas of consistency or inconsistency (NEI 20-09)
- Provide key input to PRA acceptability with an appropriate level of confidence in the models, results, and insights
- Minimize the number of RAIs and regulatory audits of the applicant's PRA against the non-LWR PRA standard to determine its technical quality and capability
- Achieve efficiency in licensing reviews

Observations on the Revision of NEI 20-09, Rev. 0



- Approach:
 - ♦ Consider NEI 20-09 as clarifying guidance for the advanced non-LWR (ANLWR) PRA standard (ASME/ANS RA-S-1.4, particularly Section 6)
 - ♦ Focus on key differences between ANLWRs and operating reactors from a PRA peer review perspective
 - ♦ Provide comments to highlight and focus attention on key differences during PRA peer review

Observations on the Revision of NEI 20-09, Rev. 0



- Key differences for non-LWR PRA peer reviews:
 - ♦ Novel designs and operational characteristics
 - ♦ Limited operational experience
 - ♦ PRA used at different stages of design, licensing, and operation
 - ♦ Peer reviewer qualifications

Observations on the Revision of NEI 20-09, Rev. 0



- Consistent with NEI ANLWR roadmap for NEI 20-09
- Comments highlight and emphasize key differences for ANLWR peer reviews

Next Steps



- NRC staff will continue to evaluate and provide comments on NEI 20-09 taking into consideration:
 - Development of various ANLWR PRA related documents
 - Finalization and location of various NRC positions
- Observation of non-LWR peer reviews pilot(s) will support NRC staff's confidence and accelerate endorsement of NEI 20-09

Next Steps for Endorsement



- Staff is requesting input from potential applicants on their anticipated use of the ANLWR PRA standard to help in developing endorsement schedule
- Staff will update Project Plan when an endorsement option is confirmed
- Briefing to ACRS SC on November 2, 2020
- Future public meeting planned for January 2021 and every 2-3 months going forward

Acronyms



- ANLWR - advanced non-light water reactor
- ANS - American Nuclear Society
- ASME - American Society of Mechanical Engineers
- COL - combined license
- CP - construction permit
- DC - design certification
- ISG - interim staff guidance
- JCNRM - Joint Committee on Nuclear Risk Management
- LMP - licensing modernization project
- LPSD - low-power and shutdown
- LWR - light water reactor
- NEI - Nuclear Energy Institute
- NRC - Nuclear Regulatory Commission
- NRR - Office of Nuclear Reactor Regulation
- OGC - Office of the General Counsel
- OL - operating license
- RES - Office of Nuclear Regulatory Research
- RG - regulatory guide
- SC - subcommittee
- SP - staff position
- SR - supporting requirement
- SSC - structure, system, and component