

Changes in Draft NUREG-1927, Rev. 1 Standard Review Plan for Renewal of Specific Licenses and Certificates of Compliance for Dry Storage of Spent Nuclear Fuel

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Public Meeting on Proposed Changes in Draft NUREG-1927, Revision 1

July 29, 2015

Storage Renewal Requirements and Guidance

- Renewal of Independent Spent Fuel Storage Installation (ISFSI) specific licenses and Certificates of Compliance (CoCs) for storage cask designs, for a period not to exceed 40 years (10 CFR §72.42 and §72.240)
- Time-limited aging analyses (TLAAs)
- Description of the Aging Management Programs (AMPs)
- Design bases information as documented in the most recently updated final safety analysis report
- NUREG-1927, Rev. 0 issued in March 2011

NUREG-1927, Rev. 0 → Draft Rev. 1

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- Review experience indicated need for expanded guidance
 - 15 expected renewal applications from 2015 to 2025
 - NRC Intra-Agency team assessed the current regulatory framework for storage renewals to determine what changes are needed
 - NUREG-1927 revision identified as a high-priority, in addition to development of additional guidance and infrastructure
 - NRC staff developed a draft Rev. 1 to NUREG-1927, to address recent review experience and input from stakeholders

Stakeholder Outreach on Potential Changes to NUREG-1927



- Valuable input from stakeholders at over 20 NRC-sponsored public meetings, including:
 - March 2014 – Regulatory Information Conference (RIC)
 - April 2014 – Meeting with Nuclear Energy Institute (NEI) re: industry and NRC plans for developing renewal guidance
 - **July 2014 – Meeting to obtain stakeholder feedback on potential changes to NUREG-1927**
 - November 2014 – Division of Spent Fuel Management Regulatory Conference
 - March 2015 – RIC
 - March 2015 – Meeting with NEI on NEI 14-03, Rev. 0, Guidance for Operations-Based Aging Management for Dry Cask Storage
 - April 2015 – Meeting with Advisory Committee on Reactor Safeguards (ACRS) Subcommittee on Metallurgy & Reactor Fuels
 - Numerous meetings re: renewal applications for licenses and CoCs
- Participated in workshops, conferences and meetings

Draft NUREG-1927, Rev. 1

Structure and Format



- Updates and clarifications made throughout Draft NUREG-1927, Rev. 1
- Upfront material (Abstract, Abbreviations, Introduction)
- Chapter 1: General Information Review
- Chapter 2: Scoping Evaluation
- Chapter 3: Aging Management Review
 - Time-Limited Aging Analyses
 - Aging Management Programs
- Chapter 4: References
- Chapter 5: Glossary
- Appendices

Chapter 1:

General Information Review

- Expanded guidance on application content, particularly for CoC renewals
- Added section on timely renewal
- Added reviewer guidance for amendment applications submitted during renewal reviews or after the renewal is issued
- Added reviewer guidance for use of conditions for ensuring AMPs remain effective during the period of extended operation (PEO)

Chapter 2:

Scoping Evaluation

- Scoping evaluation identifies structures, systems, and components (SSCs) reviewed for aging mechanisms and effects
- Clarified sources of information that may be used to support the evaluation
- Expanded guidance for:
 - Review of SSC subcomponents
 - Scoping of dry storage system internals
 - Identifying SSCs within the scope of renewal
- Clarified reviewer guidance for ensuring exclusions from the scope of renewal are justified

Chapter 3:

Aging Management Review

- Aging management review assesses proposed aging management activities for SSCs within the scope of renewal.
- Expanded guidance on environmental data and identification of aging mechanisms and effects:
 - Lead system inspection results
 - Use of maintenance records, operating experience specific to material/service environment (site-specific, industry-wide)
 - Use of consensus codes/standards
 - Other applicable NRC guidance or reports

Chapter 3: Aging Management Review (cont.)



- Expanded discussion on aging management review for dry storage system internals
- Revised TLAA section:
 - ensure consistency with 10 CFR §72.3
 - provide guidance for review of calculations/analyses not part of approved design bases
- Expanded discussion on each of ten AMP elements
- Provided new guidance on learning AMPs and use of operating experience

Chapter 3: Aging Management Review (cont.)

- Included discussion of specific NEI 14-03 concepts:
 - Use of “tollgates” or periodic assessments of operating experience/confirmatory research
 - Aggregation and dissemination of operating experience
- Consolidated guidance discussion on retrievability
- Added sections on:
 - Commencement of AMPs for CoC Renewals
 - Implementation of AMPs (timing for implementation considering licenses/CoCs in timely renewal)

Chapters 4 & 5: Consolidated References and Glossary



- Added list of consolidated references as new Chapter 4
- Moved definitions to new Chapter 5, Glossary
- Updated terminology and definitions:
 - Added/clarified existing definitions; made consistent with 10 CFR §72.3, NUREG-1536 and NUREG-1567

Appendices

- Appendix A on Non-Quantifiable Terms – No changes
- Removed appendices that added minimal value to the review process
- Added new appendices:
 - Example AMPs (Appendix B)
 - Lead system inspections (Appendix C)
 - Use of a demonstration program as a surveillance tool for high burnup (HBU) fuel performance, per ISG-24 (Appendix D)
 - Considerations for CoC renewals (Appendix E)
 - Storage terms and calculation of length of time that a dry storage system (DSS) can remain loaded (Appendix F)

Appendix B: Example AMPs

- Example AMPs:
 - Localized Corrosion and Stress Corrosion Cracking of Welded Stainless Steel Dry Storage Canisters
 - Reinforced Concrete Structures
 - HBU Fuel Monitoring and Assessment Program
- Use consensus codes and standards where practicable for the examination methods, equipment calibration, acceptance criteria, and personnel qualifications
- Use achievable and actionable acceptance criteria
- Rely on licensee quality assurance and corrective action programs for further evaluation, characterization, and other actions as needed to preserve the SSC intended functions

Appendix B:

AMP – Welded Stainless Steel Canisters



- Based on guidance in consensus standards/guides and NUREG reports:
 - ASME Code Section XI, “Rules For Inservice Inspection Of Nuclear Power Plant Components”
 - NUREG-1801, “Generic Aging Lessons Learned (GALL) Report”
- Inservice inspection for localized corrosion and stress corrosion cracking
 - Canister surfaces, welds, and weld heat affected zones for discontinuities and imperfections
 - Appearance and location of atmospheric deposits on the canister surfaces
 - Size and location of localized corrosion (e.g., pitting and crevice corrosion) and stress corrosion cracks

Appendix B:

AMP – Reinforced Concrete Structures



- Based on guidance in consensus standards/guides and NUREG reports:
 - ACI 349.3R, “Evaluation of Existing Nuclear Safety-Related Concrete Structures”
 - ASME Code Section XI, Subsection IWL, “Requirements for Class CC Concrete Components of Light-Water-Cooled Plants”
 - NUREG-1801, “Generic Aging Lessons Learned (GALL) Report”
- Visual inspection of above-grade and below-grade areas
- Groundwater chemistry program (mitigation)
- Radiation surveys (performance monitoring)
- Daily inspections of air inlets/outlets (prevention)

Appendix B: AMP – HBU Fuel Monitoring and Assessment Program



- Confirmation that degradation does not result in an unanalyzed fuel configuration during the PEO
- Licensee's program of monitoring and assessing data from a surrogate demonstration program and other information to confirm HBU fuel performance during PEO
 - Surrogate demonstration program to meet the guidance in Appendix D (ISG-24)
 - Includes formal evaluations of non-destructive examination and destructive examination data that may come out of a surrogate demonstration program at different times

Appendix C: Lead System Inspection(s)

- Expanded guidance for Lead System Inspection(s)
 - Purpose of the Lead System Inspection
 - Selecting System(s) for Inspection:
 - Inspection of multiple systems may be necessary to capture variations in designs, environments, materials, loadings, and applicable aging effects
 - Guidelines for the Lead System Inspection
 - Use of Surrogate Inspections
 - Considerations for Lead System Inspections for CoC Renewals

Appendix D:

ISG-24

- Use of a Demonstration Program as a Surveillance Tool for Confirmation of Integrity of High Burnup Fuel During the Period of Extended Operation
 - Confirm expected fuel conditions, based on technical arguments made in ISG-11, Rev. 3
 - Confirm the system is sufficiently dry to eliminate moisture-driven degradation from consideration
 - Provide data for benchmarking, confirm predictive models, and update AMPs, as necessary
 - Identify any aging effects that may be missed through short-term accelerated studies and analyses

Appendix E:

Considerations for CoC Renewals



- Development of TLAAAs and AMPs
 - CoC holders
- Implementation of AMPs
 - General licensees to comply with the terms, conditions, and specifications of the CoC, including but not limited to, the requirements of any AMP (10 CFR §72.212(b)(11))
 - General licensees should update the evaluation required under 10 CFR 72.212(b)(5) to show how they will meet the new CoC terms, conditions, or specifications for aging management
- Corrective Actions
 - General licensees use their Corrective Action Program (consistent with the criteria in 10 CFR Part 50, Appendix B) to capture and address aging effects.

Appendix F: Storage Terms (CoC Renewals)



- Flow chart for calculating length of storage term of a DSS loaded during either the initial storage period or renewal period(s) of a CoC

Stakeholder comment requested on Draft NUREG-1927, Rev. 1



- Request for comment in July 7, 2015, *Federal Register*
- Comment requested on any areas of the Draft Rev. 1
- NRC is specifically seeking input on:
 - AMP discussion in Section 3.6
 - Example AMPs in Appendix B
 - Lead System Inspections in Appendix C
 - Aging management review consideration of the duration of time between the fabrication of a component and its deployment in the ISFSI, in Chapter 3
 - Options for an operating experience sharing program, in Section 3.6.1.10

How to Submit Comments on Draft NUREG-1927, Rev. 1



- Electronically on Federal Rulemaking Website:
<http://www.regulations.gov>, **Docket ID NRC-2015-0106**
- Mail comments to: Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Division of Administrative Services, Office of Administration, Mail Stop: OWFN-12-H08, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001
- For any questions about the material in Draft NUREG-1927, Rev. 1, contact:
 - Kristina Banovac, Kristina.Banovac@nrc.gov, 301-415-7116
 - Ricardo Torres, Ricardo.Torres@nrc.gov, 301-415-7508

Path Forward



- Public comment period on Draft NUREG-1927, Rev. 1 ends August 21, 2015
- Address public comments and finalize guidance
- Engage with ACRS on proposed final guidance (Spring 2016)
- Publish final guidance (Summer 2016)

References

- 10 CFR Part 72
<http://www.nrc.gov/reading-rm/doc-collections/cfr/part072/>
- NUREG-1927, Rev. 0
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1927/r0/>
- Draft NUREG-1927, Rev. 1
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1927/r1/>
- FRN issuing Draft NUREG-1927, Rev. 1 for public comment
<http://www.gpo.gov/fdsys/pkg/FR-2015-07-07/pdf/2015-16540.pdf>
- NUREG-1536
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536/>
- NUREG-1567
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1567/>
- ISG-24
<http://pbadupws.nrc.gov/docs/ML1405/ML14058B166.pdf>
- ISG-11
<http://www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf>

Acronyms

- ACI: American Concrete Institute
- ACRS: Advisory Committee on Reactor Safeguards
- AMP: Aging Management Program
- ASME: American Society of Mechanical Engineers
- CFR: Code of Federal Regulations
- CoC: Certificate of Compliance
- DSS: Dry Storage System
- HBU: High Burnup
- ISFSI: Independent Spent Fuel Storage Installation
- ISG: Interim Staff Guidance
- NEI: Nuclear Energy Institute
- PEO: Period of Extended Operation
- RIC: Regulatory Information Conference
- SSC: Structure, System and Component
- TLAA: Time-Limited Aging Analysis