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## Template of a License Renewal Technical Report

The Technical Report contains two main sections: Scoping and Aging Management. Contents of each are provided below.

### **I. Scoping**

#### **A. System/Structure/Component description**

- Provide a general description of the system's purpose and major equipment, including, where appropriate, reference to UFSAR sections.
- Include the conceptual boundaries from the System level scoping results.
- If this is a non system LRA, then a discussion of the make-up of the commodity group should be provided with reference to or incorporation of details from the methodology.
- The information provided herein should be of sufficient detail to allow a reader who is unfamiliar with CCNPP specifics to gain an understanding of the system.

#### **B. Scoped SCs and their intended functions**

- Briefly discuss the portion of the system subject to an AMR. Sufficient information should be provided such that a reader who is unfamiliar with CCNPP specifics can gain an appreciation for what is in scope and why. Important here is the relation of the SC to the function that caused the SC to require an AMR.
- Include a simplified system/structure diagram, or reference a drawing in the UFSAR, if that would be helpful.
- Provide a discussion of any SCs within the conceptual boundaries that are covered by a separate AMR/commodity report.
- A listing or table should detail which SCs (or SCs groups) require an AMR.
- Detail here can be limited by referencing the methodology scoping sections.
- List passive intended functions of SCs subject to an AMR. Briefly discuss which passive functions are covered by another AMR or commodity report.
- Any unique grouping or unique major equipment for the LRA should be included here, if appropriate. (The listing of SCs requiring an AMR given above will generally reflect the organization of the rest of the LRA. The purpose of this step is to explain differences between that list and the remaining LRA sections, if any.)

### **II. Aging Management**

- #### **A. Introduce and include a table indicating all Age-Related-Degradation-Mechanisms (ARDMs) considered (potential ARDMs) and those determined to result in plausible aging effects.**

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- B. The following demonstration (items 1 through 5 below) must be provided for each component type (or group of similar component types) subject to AMR. The arrangement of the information will depend on the results of the AMR, combining components for efficiency based on common materials, environment, aging mechanisms, methods to manage aging, or programs to manage aging, while ensuring that the flow of demonstration logic is still clear:

1. SC materials and environment

- Provide details of the SC materials of construction that are pertinent to the plausible aging issues/passive intended functions.
- Provide a description of the environment(s) to which the SC is subjected, and identify the pertinent environmental parameters related to the aging effects decisions (i.e., plausible and non-plausible determinations). (This might include standby system stagnant conditions.)

Note: In item #2 below the guidance calls for discussing non-plausible ARDMs, based on their "visibility." There may be groups of SCs where multiple non-plausible ARDMs are to be discussed, where, for efficiency, the discussion could be inserted here once, as opposed to repetitive discussions.

2. Plausible aging mechanisms and their effects on SC functions

Describe the aging issues that were considered, including:

- Plausible ARDMs, non-plausible ARDMs (as determined to be required based on "visibility" of issue), and relevant Generic Safety Issue (GSI)/Unresolved Safety Issue (USI) related aging issues.
- Include in the discussion the basis for plausibility/non-plausibility determinations. References to source material should be made, as appropriate.
- Discuss the resultant aging effects of plausible ARDMs. For instance, for piping these are things like cracks in piping, loss of material, loss of mechanical closure integrity of bolted connections.
- Describe how the ARDM(s) affect the SC(s). How do the mechanisms progress? How do they reveal themselves? What do they look like?
- How/to what extent is the passive intended function affected under all CLB conditions?

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### 3. Methods<sup>1</sup> to manage the ARDMs/effects of the ARDMs

#### Mitigation of the ARDM(s)

- Include **methods** discussed in the Aging Management Review (AMR) Report to mitigate the onset and/or propagation of degradation.
  - Refer back to the characteristics of the applicable ARDM(s) when describing these methods.
  - Discuss what conditions would be maintained? These could be controlled conditions (coatings/painting, ph of internal fluid, etc.) or design conditions that go beyond basic design (like oil-impregnated sand under a fuel oil tank, for instance).

#### Discovery of the effect(s) of the ARDM(s)

- Include **methods** discussed in the Aging Management Review (AMR) Report to discover the onset and/or propagation of degradation, such as inspecting, monitoring, testing, etc.
  - Refer back to the characteristics of the applicable ARDM(s) when describing these methods.
  - Discuss what conditions would be monitored/inspected. These methods must detect the aging effect over a time period in which there is reasonable assurance that detection will occur prior to the loss of the intended function under all CLB conditions.

### 4. Identification and description of aging management programs (AMPs)

#### Mitigation of the ARDM(s)

- Provide information on **existing** plant program(s) which have the SC group within their scope, and which provide mitigation for the SC group/ARDM(s) combination.
  - Include the name of the program.
  - Review the program purpose, scope, bases, developmental standards, references and procedural steps, then provide information that implements the methods discussed in 3.
  - Provide the elements of the program that implement the methods identified in 3. The elements involve the technology applied to carry out the program,

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<sup>1</sup> Section 6.3 of the CCNPP IPA Methodology, "Methods to Manage the Effects of Aging," has guidance.

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which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc. again *only* as they implement the methods discussed in 3.

- Discuss acceptance criteria to ensure timely corrective actions. This should also include a confirmation process to ensure the corrective actions are effective.
  - If applicable<sup>3</sup>, discuss how the program is periodically verified such that there is reasonable assurance that the program will continue to mitigate the aging effect.
  - Briefly discuss relevant CCNPP operating experience with this program.
- For existing plant programs that must be **modified**,
    - Provide the information from above for the existing portion.
    - Describe the aspects that must be modified and how they will affect the program purpose, scope, bases, developmental standards, references or procedural steps.
    - Describe new elements added to carry out the program. The elements involve the technology applied to carry out the program, which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc.
    - Describe how the modified portions implement the methods discussed in 3.
    - If applicable<sup>3</sup>, discuss how the program is periodically verified such that there is reasonable assurance that the program will continue to mitigate the aging effect.
    - Briefly discuss relevant CCNPP (or industry, if applicable) operating experience with this program.
  - For **new** programs,
    - Describe the new program purpose, scope, bases, developmental standards, and references.
    - Describe the new elements for carrying out the program. The elements involve the technology applied to carry out the program, which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc.
    - Describe this information in sufficient detail to demonstrate that the new program implements the methods discussed in 3.

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<sup>2</sup> Details of the frequency and criteria can be referenced.

<sup>3</sup> Typically, the aging management programs involve both mitigation and discovery, in which case the discovery activity will serve to satisfy the verification of the mitigation activity.



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- If applicable,<sup>3</sup> discuss how the program will be periodically verified such that there is reasonable assurance that the program will continue to mitigate the aging effect.

### Discovery of the effects of the ARDM(s)

- Provide information on **existing** plant program(s) which have the SC group within their scope, and which provide discovery for the SC group/ARDM(s) combination.
  - Include the name of the program.
  - Review the program purpose, scope, bases, developmental standards, references and procedural steps, then provide information that implements the methods discussed in 3.
  - Provide the elements of the program that match the methods identified in 3. The elements involve the technology applied to carry out the program, which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc. again *only* as they implement the methods discussed in 3.
  - Discuss acceptance criteria to ensure timely corrective actions. This should also include a confirmation process to ensure the corrective actions are effective.
  - If applicable, discuss how the program is periodically verified such that there is reasonable assurance that the program will continue to discover the aging effect.
  - Briefly discuss relevant CCNPP operating experience with this program.
- For existing plant programs that must be **modified**,
  - Provide the information from above for the existing portion.
  - Describe the aspects that must be modified and how they will affect the program purpose, scope, bases, developmental standards, references or procedural steps.
  - Describe new elements added to carry out the program. The elements involve the technology applied to carry out the program, which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc.
  - Describe how the modified portions implement the methods discussed in 3.

<sup>3</sup> Typically, when the aging management programs involve both mitigation and discovery, the discovery activity will serve to satisfy the verification of the mitigation activity.

<sup>2</sup> Details of the frequency and criteria can be referenced.

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- If applicable, discuss how the program is periodically verified such that there is reasonable assurance that the program will continue to discover the aging effect.
  - Briefly discuss relevant CCNPP (or industry, if applicable) operating experience with this program.
  - For **new** programs,
    - Describe the new program purpose, scope, bases, developmental standards, and references.
    - Describe the new elements for carrying out the program. The elements involve the technology applied to carry out the program, which could include the frequency and the criteria for establishing the frequency<sup>2</sup> of performance, sample size or location, parameters measured, etc.
    - Describe this information in sufficient detail to demonstrate that the new program implements the methods discussed in 3.
    - If applicable, discuss how the program will be periodically verified such that there is reasonable assurance that the program will continue to discover the aging effect.
5. Demonstration of how AMPs manage effects such that the intended function(s) is(are) maintained, consistent with the CLB, during the period of extended operation.
- Using specifics from the aging management discussion above, explain how the aging management program(s) effectively manage(s) the SC (or SC group) aging effect such that there is reasonable assurance that the intended function will be maintained, consistent with the CLB, during the period of extended operation. -
  - For example:
    - Feedwater piping provides for pressure boundary integrity under CLB design conditions.
    - Erosion/Corrosion is plausible for feedwater piping, causing wall thinning (loss of material) which can lead to loss of pressure boundary integrity.
    - Calvert Cliffs' erosion/corrosion program will detect wall thinning and contains acceptance criteria that ensure corrective actions will be taken such that there is reasonable assurance that the pressure boundary integrity function will be maintained.

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<sup>2</sup> Details of the frequency and criteria can be referenced.

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- Therefore, there is reasonable assurance that the pressure boundary integrity provided by the feedwater piping will be maintained, consistent with the CLB, during the period of extended operation.

### III. Conclusion

Include the statement, "The programs discussed for < name of system > are listed in the following table. These programs are administratively controlled by a formal review and approval process. As demonstrated above, these programs will manage the aging mechanisms and their effects such that the intended functions of the < name of system > will be maintained, consistent with the CLB, during the period of extended operation."

Provide a table of the applicable aging management programs.

### IV. Reference List

- Complete each Technical Report with a list of pertinent references.