Enclosure 1

TOPICS THAT REQUIRE A SLRA SUPPLEMENT

Virginia Electric and Power Company
(Dominion Energy Virginia)
Surry Power Station Units 1 and 2

The following forty-five topics require the SLRA to be supplemented:

1. Cracking of Cu >15% Zn for Water Treatment Valves
2. Cracking of Cu >15% Zn for Fire Protection Spray Nozzles
3. TLAA Clarification
4. FER Section 3.2.2.2.9 Correction
5. Recirculation Spray System Pump Suction Piping Note
6. Containment Sump Pumps Material Clarification
7. Manage FAC for Feedwater Heater Channel
8. Program Management of Stainless Steel Crane Components
9. Diesel Fire Pump Engine Component Clarification
10. Loss of Material in Fiberglass Aging Management
11. Steam Generator Primary Inlet and Outlet Nozzle AMR Clarification
12. Addition of System and Component Specific Erosion
13. Heat Exchanger Tube Heat Transfer Function Clarification
14. Security Fuel Oil Tank and Piping Program Management Clarification
15. Spent Fuel Pool Liner Fatigue TLAA AMR Lines
16. Leaching of Concrete in Structures
17. *ASME Section XI, Subsection IWE* program Clarifications – Containment Liner Boundary, Dissimilar Metal Welds, and Seals and Gaskets
18. Galvanized Steel Supports Clarification
19. Flood Barrier Intended Function in Miscellaneous Structural Commodities Clarification
20. Clarification of Flood Dike Components
21. Stainless Steel and Aluminum Structural Components
22. A*SME Section XI, Subsection IWE* program Exception Consistency Notes
23. Cracking of Titanium Valves in Raw Water in the Service Water System
24. Cast Austenitic Stainless Steel Control Rod Drive Mechanism Latch Housings
25. Alternate AC Diesel Generator Jacket Water Expansion Tank
26. Pressure-Temperature Limits: Current PT Curves and 68 EFPY PT Curves Clarification
27. Low Temperature Overpressure Protection Analysis: Correction to WCAP Reference in LTOP Section
28. Environmental-Assisted Fatigue: Update to Calculation
29. Crane Load Cycle Limits: Update to TLAA Evaluation Updated
30. Piping Subsurface Flaw Evaluations: Update to SLRA Table 4.7.5-1
31. *Flow Accelerated Corrosion* program (B2.1.8): Enhancement #1 Clarification
32. *Bolting Integrity* program (B2.1.9): Program Description and UFSAR Supplement Revisions
33. *Open-Cycle Cooling Water System* program (B2.1.11): Program Description Revision

34. *Fire Water System* program (B2.1.16): Enhancements Added/Clarified, Program Description and UFSAR Supplement Revisions
35. *Fuel Oil Chemistry* program (B2.1.18): Program Description, UFSAR Supplement, Exceptions, and Enhancements Revisions
36. *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program (B2.1.25): Program Description, UFSAR Supplement, and Enhancements Revisions
37. *Buried and Underground Piping and Tanks program (B2.1.27): Enhancement 2 completed, Enhancement 3 Clarified, and UFSAR Supplement* Revisions
38. *Internal Coatings/Linings For In-Scope Piping, Piping Components, Heat Exchangers, and Tanks program (B2.1.28):* Program Description, UFSAR Supplement and Enhancements Revisions; Exceptions and Enhancements Additions
39. *ASME Section XI, Subsection IWE program (B2.1.29):* Enhancement Revision and Exception Addition
40. *ASME Section XI, Subsection IWF program (B2.1.31):* Enhancement Addition
41. *Structures Monitoring program (B2.1.34):* Program Description, UFSAR Supplement and Enhancements Revised; Enhancements Added
42. *Protective Coating Monitoring and Maintenance program (B2.1.36):* Program Description Revision
43. *Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10CFR 50.49 Environmental Qualification Requirements program(B2.1.39):* Program Description Revision and Enhancement Addition
44. Appendix C MRP-227-A Gap Analysis for PWR Vessel Internals Aging Management: Gap Analysis Tables Clarified/Revised
45. Leak-Before-Break, Update to SLRA Section 4.7.3

The following forty-five topics require the SLRA to be supplemented:

1. Cracking of Cu >15% Zn for Water Treatment Valves

A review of specific Cu >15% Zn components in the Auxiliary Systems and Steam and Power Conversion Systems was performed to confirm that components assigned an air - indoor uncontrolled environment, that were not assigned the aging effect of cracking, were either not insulated, or were normally above 212 °F. The review identified some Cu >15% Zn valve bodies in domestic hot water piping (in the water treatment system) that are insulated, but are less than 212 °F.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add an AMR row to the following SLRA Tables to address management of external cracking for these components and clarify the Table 1 discussion:

SLRA Tables
3.3.1
3.3.2-28

2. Cracking of Cu >15% Zn for Fire Protection Spray Nozzles

Cracking of Cu >15% Zn is an applicable aging effect for fire protection spray nozzles in an air – outdoor environment and requires aging management.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add an AMR row to the following SLRA Tables to address aging management for cracking of fire protection system Cu >15% Zn sprinkler heads in an air – outdoor environment and to clarify the associated Table 1 discussion:

SLRA Tables
3.3.1
3.3.2-34

3. TLAA Clarification

A TLAA identified for fire protection piping, was inadvertently applied to the fire protection system. The TLAA should have been assigned to a component in the fuel pool cooling system instead.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add an AMR row to the following SLRA Tables to address management of a TLAA in the fuel pool cooling system and remove an inapplicable TLAA row from the fire protection system:

SLRA Tables
3.3.2-2
3.3.2-34

4. FER Section 3.2.2.2.9 Correction

SLRA Section 3.2.2.2.9, "Further Evaluation of Aging Management as Recommended by NUREG-2192" specifies a pointer to Table 3.3.1, Item Number 3.3.1-078. Item Number 3.3.1-078 is incorrectly indicated for stainless steel components with an external environment of concrete that exit the concrete into soil and are managed by the *Buried and Underground Piping and Tanks* program. The pointer should have been to Table 3.2.1, Item Number 3.2.1-078.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to correct the pointer in the following SLRA Section so that it indicates the correct Table 1 Item Number:

SLRA Section
3.2.2.2.9

5. Recirculation Spray System Pump Suction Piping Note

The recirculation spray system pump suction piping in concrete in Table 3.2.2-2 should have the same plant-specific note as safety injection suction piping in concrete in Table 3.2.2-4.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add a clarifying note to the following SLRA Table:

SLRA Table
3.2.2-2

6. Containment Sump Pumps Material Clarification

UFSAR Table 6.2-7 identifies that aluminum is present in Containment. A review was performed to confirm the scope of aluminum mechanical components subject to aging management review that are located in Containment. As a result of that review, the containment sump pumps were identified as being constructed of aluminum and subject to aging management.

Material references indicate that no other mechanical components that are subject to aging management review and located in Containment are made of aluminum.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to clarify the presence of aluminum in Containment in the following:

SLRA Sections	SLRA Tables
3.3.2.1.20	3.3.1
3.3.2.2.8	3.3.2-20
3.3.2.2.10	

7. Manage FAC for Feedwater Heater Channel

As a result of questions asked during the in-house audit, it has been determined that flow-accelerated corrosion (FAC) is an aging effect requiring management (AERM) for the first point feedwater heater channel.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add FAC as an AERM in the following SLRA Table.

SLRA Table
3.4.2-8

8. Program Management of Stainless Steel Crane Components

The stainless steel components requiring aging management for Cranes and Hoists should cite the *Structures Monitoring* program instead of the *One-Time Inspection* program.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to specify the correct aging management program in the following:

SLRA Section	SLRA Table
3.5.2.2.2.4	3.3.2-3

9. Diesel Fire Pump Engine Component Clarification

Some diesel fire pump engine components are being clarified to indicate they are not subject to aging management review (AMR). These components are not subject to AMR because they are located within the diesel fire pump engine skid and are part of the active assembly.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add clarification to the system evaluation boundary discussion in the following SLRA Section that these diesel fire pump engine components are within the diesel fire pump engine skid active assembly:

SLRA Section
2.3.3.34

10. Loss of Material in Fiberglass Aging Management

The *Flow-Accelerated Corrosion* program was inappropriately assigned to manage internal loss of material ("wall thinning") of fiberglass piping in the service water system since the *Flow-Accelerated Corrosion* program does not address fiberglass material. Loss of material from the service water fiberglass piping will be managed by the *Open-Cycle Cooling Water System* program for piping within the scope of GL 89-13 (an AMR line item already exists for this population), and by the *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program for fiberglass piping not within the scope of GL 89-13.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to update the aging management program that manages loss of material for the service water fiberglass piping in the following SLRA Table:

SLRA Table
3.3.2-4

11. Steam Generator Primary Inlet and Outlet Nozzle AMR Clarification

SLRA Table 3.1.2-4 provides the Aging Management Results for the Reactor Vessel, Internals, and Reactor Coolant System – Steam Generator. Table 1 Item Number 3.1.1-033 (NUREG-2191, Item IV.D1.RP-232) for the Channel head (and cladding), and Table 1 Item Number 3.1.1-127 (NUREG-2191, Item IV.D1.R-436) for the Primary inlet nozzle and outlet nozzle (and cladding), were applied to both components. However, Table 1 Item Number 3.1.1-033 is applicable to RC pressure boundary components and Table 1 Item Number 3.1.1-127 is applicable to steam generator components, which are treated separately in NUREG-2191.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to update the Table 1 and Table 2 items in the following SLRA Tables:

SLRA Tables
3.1.1
3.1.2-4

12. Addition of System and Component Specific Erosion

As a result of OE related to cavitation/erosion, some valves used to throttle flow in the bearing cooling system should have an additional AMR line item identifying wall thinning as an aging effect that will be managed by the *Flow-Accelerated Corrosion* program.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to update the environment definitions and add AMR rows for erosion in the following SLRA Tables:

SLRA Tables
3.0-1
3.3.2-6
3.4.1

13. Heat Exchanger Tube Heat Transfer Function Clarification

Several heat exchanger tube components with a heat transfer function have been identified for which reduction of heat transfer was not identified as an aging effect for at least one side. The aging effect should have been applied to both sides of these components.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to update the aging effect to include reduction of heat transfer in the following:

SLRA Section	SLRA Tables
3.1.2.1.3	3.1.2-3
	3.3.1
	3.3.2-8
	3.3.2-9
	3.3.2-37

14. Security Fuel Oil Tank and Piping Program Management Clarification

In response to NRC reviewer questions regarding the potential coating of the security fuel oil tank, crediting NUREG-2191 line items that did not require One-Time Inspection for steel in fuel oil does not apply. For the steel piping, piping components and pump casing exposed to fuel oil in the security system, NUREG-2191 Item VII.H2.AP-105 (Fuel Oil Chemistry and One-Time Inspection) is applied to the steel piping, piping components and pump casing instead. Additionally, SLRA Table 3.3.1, Item Number 3.3.1-070 is updated to clarify that the *One-Time Inspection* program is used along with the *Fuel Oil Chemistry* program to manage the aging effects in the security system.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to update the programs used to manage the aging effects for steel exposed to fuel oil for piping, piping components and the pump casing (fuel oil) in the following SLRA Tables:

SLRA Tables
3.3.1
3.3.2-38

15. Spent Fuel Pool Liner Fatigue TLAA AMR Lines

Spent fuel pool liner fatigue was identified as a TLAA in SLRA Section 4.7.4, but no AMR line items for the aging effect were specified in the SLRA.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to correctly identify the Spent Fuel Pool Liner Fatigue Analysis:

SLRA Table
3.5.2-5

16. Leaching of Concrete in Structures

SLRA Table 3.5.1, Item Number 3.5.1-063, addresses the Aging Effect/Mechanism of "Increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation" for concrete (accessible areas) for Groups 1-3, 5, 7-9 structures. The Discussion column for Item Number 3.5.1-063 indicates, "Consistent with NUREG-2191"; however, there were no applicable structures in Tables 3.5.2-x that identified this aging effect as being managed.

The aging effect of "Increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation" is required for concrete elements of applicable structures.

SLRA Table 3.5.1, Item Number 3.5.1-020 addresses this same aging effect for concrete (accessible areas) for the Containment dome, wall, basemat, ring girders, and buttresses. Table 3.5.1, Item Number 3.5.1-020 of the SLRA, is revised to note, "Consistent with NUREG-2191," and the SLRA is supplemented to include the applicable concrete elements that are managed for this aging effect.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, in the following:

SLRA Sections	SLRA Tables
3.5.2.1.1	3.5.1
3.5.2.1.2	3.5.2-1
3.5.2.1.5	3.5.2-2
3.5.2.1.9	3.5.2-5
3.5.2.1.10 through 3.5.2.1.35	3.5.2-9 through 3.5.2-35

17. ASME Section XI, Subsection IWE program Clarifications – Containment Liner Boundary, Dissimilar Metal Welds, and Seals and Gaskets

Upon additional review, the following updates/clarifications to the *ASME Section XI, Subsection IWE* program in the SLRA are required:

1. Add a plant-specific Note to Table 3.5.2-1 and a supplemental response to Section 3.5.2.2.1.3 to note that the Containment liner includes liner anchors and integral attachments.
2. Add an AMR line to Table 3.5.2-1 for loss of material for mechanical penetration dissimilar metal welds.
3. Delete reference to "caulking and sealants" from Tables 2.4.1-1 and 3.5.2-1 since there is no moisture barrier between the Containment liner-concrete interface; and revise the response to Item Number 3.5.1-026 in Table 3.5.1 to note that it is, "not applicable".
4. Revise Section 2.4.1.1 and add a plant-specific Note to Table 3.5.2-1 to clarify that "O-rings" include air lock doors, penetration flanges, fuel transfer blank flanges, and other elastomer materials that are part of the Containment pressure boundary.
5. Section 3.5.2.2.1.6 is revised to augment visual examinations with surface examinations to manage cracking due to stress corrosion cracking for containment pressure boundary portions of the fuel transfer tube, fuel transfer tube enclosure, blind flange (fuel transfer tube), and dissimilar metal weld penetrations. Augmented surface examinations will be performed once during each ten year interval.
6. Table 3.3.2-1 is revised to indicate cracking due to stress corrosion cracking for the containment pressure boundary portions of the fuel transfer tube, fuel transfer

tube enclosure, and fuel transfer tube blind flange will be managed with the ASME Section XI, Subsection IWE program (B2.1.29) and the 10 CFR Part 50, Appendix J program (B2.1.32). Table 3.5.1, Item Number 3.5.1-010 is revised to indicate that in addition to the Containment Structure, components in Auxiliary Systems (Fuel Handling) are aligned to this item.

7. Table 3.5.2-1 is revised to indicate cracking due to cyclic loading for the containment pressure retaining portions of dissimilar metal weld penetrations without a CLB fatigue analysis will be managed with the ASME Section XI, Subsection IWE program (B2.1.29) and 10 CFR Part 50, Appendix J program (B2.1.32).

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, in the following:

SLRA Sections	SLRA Tables
2.4.1.1	2.4.1-1
3.5.2.2.1.3	3.5.1
3.5.2.2.1.6	3.5.2-1
	3.3.2-1

18. Galvanized Steel Supports Clarification

As noted in SLRA Table 3.5.1, Item Numbers 3.5.1-093 and 3.5.1-095, galvanized steel components are evaluated using NUREG-2191 items for steel. SLRA Table 3.5.1, Item Numbers 3.5.1-093 and 3.5.1-095 are updated to refer to Item Number 3.5.1-092, which is applicable to steel components.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, for the following SLRA Table:

SLRA Table
3.5.1

19. Flood Barrier Intended Function in Miscellaneous Structural Commodities Clarification

The intended function of Flood Barrier (FLB) was inadvertently omitted for the Penetration seals and Fire barrier seals in SLRA Tables 2.4.1-37 and 3.5.2-37.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add the intended function of FLB for Penetration Seals and Fire Barrier Seals to the following:

SLRA Tables
2.4.1-37
3.5.2-37

20. Clarification of Flood Dike Components

The flood dikes in the Service Building and Turbine Building include steel dikes, shields, and deflectors.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, to add a plant-specific note indicating that flood dikes include steel dikes, shields, and deflectors, to the following SLRA Tables:

SLRA Tables
3.5.2-16
3.5.2-17

21. Stainless Steel and Aluminum Structural Components

Stainless steel structural components in an air environment should be managed by the *Structures Monitoring* program instead of other aging management programs.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, in the following:

SLRA Sections	SLRA Tables
3.5.2.1.1	3.5.2-1
3.5.2.2.2.4	3.5.2-37

22. ASME Section XI, Subsection IWE program Exception Consistency Notes

Topic 39 in this Attachment describes a new exception to the *ASME Section XI, Subsection IWE* program. Therefore, the NUREG-2191 consistency note for the *ASME Section XI, Subsection IWE* program in Table 1 Item Number 3.5.1-027 is changed from A to B and the exception noted.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2, for the following SLRA Tables:

SLRA Tables
3.3.2-1
3.5.1
3.5.2-1

23. Cracking of Titanium Valves in Raw Water in the Service Water System

The internal environment of service water system titanium (ASTM Grade 4) drain valves for the recirculation spray heat exchangers should be listed as air-indoor uncontrolled instead of raw water in Table 3.3.2-4. The heat exchangers (and drain valves) are normally empty of water, as described in UFSAR 6.3.1.4.3. Titanium is not susceptible to cracking in air. With this change, the *Open Cycle Cooling Water* program will no longer be credited with management of cracking of titanium valves in the service water system. Cracking of other wetted titanium valves in the service water system is addressed by existing rows in Table 3.3.2-4 using the *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2.

SLRA Table
3.3.2-4

24. Cast Austenitic Stainless Steel Control Rod Drive Mechanism Latch Housings

Unit 1 has ten control rod drive mechanism latch housings that are fabricated from cast austenitic stainless steel instead of (wrought) stainless steel, and should have been assigned loss of fracture toughness as an aging effect requiring management.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2.

SLRA Section	SLRA Table
3.1.2.1.1	3.1.2-1

25. Alternate AC Diesel Generator Jacket Water Expansion Tank

Loss of material from the internal surface of the galvanized steel alternate AC diesel generator jacket water expansion tank is more appropriately managed by the *Closed Treated Water Systems* (B2.1.12) program. The material name of the tank should be "Steel" instead of "Steel with internal coating," to better reflect the metallic nature of the tank surfaces.

Based on the above, the SLRA is supplemented, as shown in Enclosure 2.

SLRA Table
3.3.2-37

26. Pressure-Temperature Limits: Current PT Curves and 68 EFPY PT Curves Clarification

The current PT curves are based upon the K_{Ia} reference stress intensity factor and the 68 EFPY PT Curves are based upon the K_{Ic} reference stress intensity factor.

In addition, Section 4.2 is supplemented to add a table link to Table 4.2.3-1 for completeness.

Based on the above, SLRA Section 4.2.5 is supplemented, as shown in Enclosure 2, to clarify the use of K_{Ia} and K_{Ic} reference stress intensity factors.

27. Low Temperature Overpressure Protection Analysis: Correction to WCAP Reference in LTOP Section

The WCAP reference in SLRA Section 4.2.6 was inadvertently provided as WCAP-18242-NP instead of WCAP-18243-NP.

SLRA Section 4.2.6 is supplemented, as shown in Enclosure 2, to correct this administrative error.

28. Environmental-Assisted Fatigue: Update to Calculation

Section 4.8, Reference 4.8-48, SIA Calculation 1600274.305, 'Selection of Sentinel Locations Based on Environmentally Assisted Fatigue Screening,' Revision 3 has been issued.

SLRA Reference 4.8-48 in Section 4.8 and Section 4.3.4 are supplemented, as shown in Enclosure 2, to identify the updated revision indicated above.

29. Crane Load Cycle Limits: Update to TLAA Evaluation Updated

Section 4.7.1, Crane Load Cycle Limits, is updated to provide justification for the residual heat removal pump motor lifting lugs not being a TLAA. The lugs are designed for the dead weight of the motors, their attachments, and rigging. The design calculations for these lugs do not specify load cycle limits and are not TLAAs.

SLRA Section 4.7.1 is supplemented to provide the justification for not considering the residual heat removal pump motor lifting lugs as a TLAA.

30. Piping Subsurface Flaw Evaluations: Updated to SLRA Table 4.7.5-1

Table 4.7.5-1, Piping Subsurface Indication Allowable and Estimated Cycles, line one and line three are revised to identify fuel pool cooling piping instead of fire protection piping. The estimated cycles in Table 4.7.5-1 is revised and conservatively set at the 80-year projected number of heatup at 165 cycles to bound the projected number of cycles for all the listed piping. Table 4.3.3-1, 80 Year Transient Cycles Projections for ANSI B31.1 Piping, is revised to add a TLAA line for fuel pool cooling piping. Table 3.3.2-2, Fuel Pool Cooling, are being revised to add an AMR TLAA line. Table 3.3.2-34, Fire Protection, is revised to delete an AMR TLAA line for the subsurface flaw evaluation.

The following Section 4.8 reference items are updated as indicated below:

- Item 83, LTR-PAFM-17-14, "Surry Units 1 and 2 Piping Subsurface Flaw Evaluation for 80 Years of Service, Subsequent License Renewal"; updated from Revision 0 to Revision 2.
- Item 76, WCAP-15550-P (Proprietary), "Technical Justification for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for Surry Units 1 and 2 Nuclear Power Plants for the Subsequent License Renewal Program (80 years) Leak-Before-Break Evaluation; updated from Revision 1 to Revision 2.
- Item 77, WCAP-15550-NP (Non-Proprietary), "Technical Justification for Eliminating Large Primary Loop Pipe Rupture as the Structural Design Basis for Surry Units 1 and 2 Nuclear Power Plants for the Subsequent License Renewal Program (80 years) Leak-Before-Break Evaluation; updated from Revision 1 to Revision 2.

The following SLRA Sections/Tables are supplemented, as shown in Enclosure 2, to add the fuel pool cooling piping cycle-based TLAA and delete the fire protection piping cycle-based TLAA for the subsurface flaw evaluation: Table 3.3.2-2, Table 3.3.2-34, Table 4.3.3-1, Table 4.7.5-1, Section 4.7.5, and Section 4.8.

31. Flow Accelerated Corrosion program (B2.1.8): Enhancement #1 Clarification

The engineering evaluation and modeling changes for the *Flow Accelerated Corrosion* program indicated in Enhancement #1 will be completed prior to entering the subsequent period of extended operation.

Table A4.0-1 Item 8 and Section B2.1.8 is supplemented, as shown in Enclosure 2, to clarify the 2% exclusion implementation schedule described in Enhancement #1 will be completed prior to entering the subsequent period of extended operation..

32. Bolting Integrity program (B2.1.9): Program Description and UFSAR Supplement Revisions

The *Bolting Integrity* program description and UFSAR Supplement are revised to include the hydrogen gas system within the scope of the program. The descriptions of the *Bolting Integrity* program in SLRA Section B2.1.9 and UFSAR Supplement A1.9 are clarified to indicate the following (added text shown in underline):

> "The program includes periodic visual inspections of closure bolting for indications of loss of preload, cracking, and loss of material due to general pitting, and crevice corrosion, MIC and wear as evidenced by leakage."

Based on the above, SLRA Sections B2.1.9 and A1.9 are revised, as shown in Enclosure 2.

33. Open-Cycle Cooling Water System program (B2.1.11): Program Description Revision

The *Open Cycle Cooling Water System* program description is revised to include aging management details for titanium tubes and tubesheets.

SLRA Sections B2.1.11, *Open Cycle Cooling Water System* program, is supplemented, as shown in Enclosure 2, to include aging management details for titanium tubes and tubesheets.

34. Fire Water System program (B2.1.16): Enhancements Added/Clarified, Program Description and UFSAR Supplement Revisions

The *Fire Water System* program revision includes the following items:

- The program description and UFSAR Supplement are revised to include cracking (copper alloy >15% Zn). The sprinkler AMR line in Table 3.3.2-34, Fire Protection, is revised to include cracking as a managed aging effect.

- Enhancement 9 is relocated from the enhancement group for elements 3 and 4 to the first enhancement group for elements 3, 4, 6 and 7.
- The one-time test (OTT) portion of Enhancement 2 is clarified to provide details of the sample size, sample selection criteria, and minimum time in service of tested sprinklers.
- A new enhancement is added to require inspections and tests be performed by personnel qualified in accordance with site procedures and programs for the specified task.
- A new enhancement is added to require when degraded coatings are detected during internal inspections of the fire water storage tank, acceptance criteria and corrective action recommendations of the *Internal Coatings/Linings For In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* program (B2.1.28) are followed in lieu of NFPA 25 Section 9.2.7 (1), (2), and (4).

SLRA Table 3.3.2-34, Note 4, has been revised as follows to be consistent with SLRA Section B2.1.16:

> "The *Fire Water System* (B2.1.16) program is used to manage loss of material and loss of coating integrity for internally coated carbon steel fire water storage tanks. Consistent with NUREG-2191, Table XI.M27-1, note 4, when degraded coatings are detected by internal coatings inspections, acceptance criteria and corrective action recommendations are followed consistent with the *Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers and Tanks* (B2.1.28) program."

The basis document for the *Fire Water System* program, element 4, fire hydrant section, has been clarified to specify the following:

> "Based on operating experience, soil conditions and groundwater issues are not expected at Surry that would prevent a fire hydrant from draining. Proper fire hydrants drainage after flushing is a procedure acceptance criterion. Failure of the fire hydrant to drain will be entered in the corrective action process and evaluated."

SLRA Section B2.1.16, Section A1.16 and Table A4.0-1, Item 16 are supplemented, as shown in Enclosure 2, with enhancement additions/clarifications, program description revisions and UFSAR Supplement revisions.

In addition, Table 3.3.2-34, Note 4, is supplemented to be consistent with Section B2.1.16.

35. Fuel Oil Chemistry program (B2.1.18): Program Description, UFSAR Supplement, Exceptions, and Enhancements Revisions

The *Fuel Oil Chemistry* program revision includes the following items:

- Section B2.1.18, program description, and A1.18, UFSAR Supplement, are revised to reference ASTM standards ASTM D 975, ASTM D1796, ASTM D6217 and ASTM D4057 and identify reduction of heat transfer as an aging effect managed by the *Fuel Oil Chemistry* (B2.1.18) program.
- The exception justification is revised to include additional considerations for leakage monitoring and maintenance of intended functions for the fuel oil tanks.
- Table A4.0-1, Item 18, Enhancement 5 incorporates the editorial change (new text shown underline and deleted text shown in strikethrough): "The frequency ~~between~~ <u>of</u> future inspections...."

SLRA Section B2.1.18, Section A1.18 and Table A4.0-1, Item 18 are supplemented, as shown in Enclosure 2, with revisions to the program description, UFSAR Supplement, exceptions, and enhancements.

36. Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.25): Program Description, UFSAR Supplement, and Enhancements Revisions

The *Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components* program revision includes the following items:

- The program description and UFSAR Supplement are revised to add aging management of cracking for Grade 2 Titanium components.
- A new enhancement is added that states when irregularities that could be indicative of an unexpected level of degradation are detected for steel components exposed to raw water, raw water (potable), or waste water, follow-up volumetric examinations are performed.

SLRA Section B2.1.25, Section A1.25 and Table A4.0-1, Item 25 are supplemented, as shown in Enclosure 2, with revisions to the program description, UFSAR Supplement, and enhancements.

37. Buried and Underground Piping and Tanks program (B2.1.27): Enhancement 2 completed, Enhancement 3 Clarified, and UFSAR Supplement Revisions

The *Buried and Underground Piping and Tanks* program revision includes the following:

- Enhancement 2 is completed. Recent procedure revisions incorporated visual inspection requirements and acceptance criteria for cracking of fiberglass

reinforced plastic (FRP) components, evaluation of FRP blisters, gouges and wear, and aging management of minor cracking and loss of material for concrete or cementitious material components.

- Enhancement 3 for cathodic protection is revised to indicate: "measurements are instant off, soil resistivity verification, and -750 mV cannot be used below 10,000 ohm-cm".
- The UFSAR Supplement was revised to note loss of material rates are measured if cathodic protection is other than -850 mV instant off.

SLRA Section B2.1.27, Section A1.27 and Table A4.0-1, Item 27 are supplemented, as shown in Enclosure 2, to indicate Enhancement 2 is completed, and Enhancement 3 and the program description are revised.

38. Internal Coatings/Linings For In-Scope Piping, Piping Components, Heat Exchangers, and Tanks program (B2.1.28): Program Description, UFSAR Supplement and Enhancements Revisions; Exceptions and Enhancements Additions

The *Internal Coatings/Linings For In-Scope Piping, Piping Components, Heat Exchangers, and Tanks* program revision includes the following:

- The program description and UFSAR Supplement are revised to include "air-dry" environment and delete the statement indicating piping inspections are sample based.
- Exception 2 was added for not performing baseline inspections of coated/lined components based upon inspection coverage of all accessible surfaces by the program.
- Exception 3 was added to perform opportunistic inspections of concrete lined fire protection piping versus periodic inspections.
- Enhancement 1 was revised to add inspection of the service water brominator mixing tanks. Enhancement 1 was also clarified to note that all accessible coated condensate polishing outlet piping and water treatment piping is inspected.
- Revised the applicable aging management program for the alternate AC jacket water expansion tank AMR line in Table 3.3.2-37 from B2.1.28 (XI.M42) to B2.1.12 (XI.M21A).
- Added an enhancement (new Enhancement 6) to require opportunistic inspections of piping internally lined with concrete.
- Added an enhancement (new Enhancement 8) to require inspection results are evaluated against acceptance criteria to confirm that the components' intended functions will be maintained throughout the subsequent period of extended operation based on the projected rate and extent of degradation.

- Revised Enhancement 9 for acceptance criteria to require:
  a) No indications of peeling or delamination.
  b) Applicable wall thickness measurements, when projected to the next inspection will meet design minimum wall requirements.
- Revised Enhancement 11 to clarify corrective actions for returning coatings to service that exhibit indications of peeling and delamination.
- Added an enhancement (new Enhancement 12) to provide corrective actions when a blister does not meet acceptance criteria.
- Added an enhancement (new Enhancement 13) to require additional inspections be conducted if one of the inspections does not meet acceptance criteria due to current or projected degradation (i.e., trending) unless the cause of the aging effect for each applicable material and environment is corrected by repair or replacement for all components constructed of the same material and exposed to the same environment.
- Added an enhancement (new Enhancement 14) to require physical testing be performed where physically possible (i.e., sufficient room to conduct testing) or examination is conducted to ensure that the extent of repaired or replaced coatings/lining encompasses sound coating/lining material.

Based on the above, SLRA Section B2.1.28, Section A1.28 and Table A4.0-1, Item 28 are supplemented, as shown in Enclosure 2, to include program description, UFSAR Supplement and enhancement revisions. Additionally exceptions and enhancements are added, as described above.

39. ASME Section XI, Subsection IWE program (B2.1.29): Enhancement Revision and Exception Addition

SLRA Section B2.1.29, Enhancement 3, is revised to require a surface examination to manage cracking due to cyclic loading for the containment pressure retaining portions of the following components without a CLB fatigue analysis: fuel transfer tube. fuel transfer tube enclosure. fuel transfer tube blind flange. dissimilar metal weld penetrations and high-temperature steel piping penetrations. Surface examinations will be performed once during each ten year interval.

SLRA Section B2.1.29, Enhancement 4, is revised to require supplemental one-time volumetric examinations of the containment liner if triggered by plant-specific operating experience during the subsequent period of extended operation. The implementation schedule for Item 29 in Table A4.0-1 was revised to indicate the following:

> "Program and subsequent license renewal enhancements will be implemented six months prior to the subsequent period of extended operation."

An exception was added to Section B2.1.29 to indicate that carbon steel components (with no CLB fatigue analysis) are not monitored for cracking utilizing supplemental surface examinations except for high temperature components (e.g., hot penetrations) that are subject to cyclic loading.

SLRA Section B2.1.29, and Table A4.0-1, Item 29 are supplemented, as shown in Enclosure 2, to add an exception and revise an enhancement. SLRA Table B2-1, SPS Program Consistency with NUREG-2191 Program, was supplemented to indicate that the *ASME Section XI, Subsection IWE* program (B2.1.29) has exceptions to NUREG-2191.

40. B2.1.31 ASME Section XI, Subsection IWF: Enhancement Addition

The *ASME Section XI, Subsection IWF* program is revised to add an enhancement that indicates the following:

> "If a component support does not exceed the acceptance standards of IWF 3400, but is electively repaired to as-new condition, then the sample is increased or modified to include another support that is representative of the remaining population of supports that were not repaired."

SLRA Section B2.1.31, and Table A4.0-1, Item 31 are supplemented, as shown in Enclosure 2, to add an enhancement.

41. Structures Monitoring program (B2.1.34): Program Description, UFSAR Supplement, and Enhancements Revised; Enhancements Added

The Struc*tures Monitoring* program is revised to include the following items:

- The program description and UFSAR Supplement are revised to include VT-1 visual examinations to detect cracking of stainless steel and aluminum components.
- The program description is revised to require evaluation of inspection results include consideration of the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation at such inaccessible areas.
- Revised Enhancement 1 to require inspections for added structures be performed under the enhanced program in order to establish quantitative baseline inspection data prior to the subsequent period of extended operation.
- Added new Enhancement 3 to revise the checklist for structural and support steel to indicate, "Are any connection members loose, missing or damaged (bolts, rivets, nuts, etc.)?".

- Revised Enhancement 4 to eliminate options for inspector qualifications that are not consistent with ACI 349.3R-002.
- Revised Enhancement 5 to include recommendations in the wood pole assessment section of EPRI 1010654, Evaluation of Wooden Pole Condition Assessment Tools, that specify a ten to fifteen years inspection cycle. Specifically, procedures will be revised to specify that wooden pole inspections will be performed every ten years by an outside firm that provides wooden pole inspection services that are consistent with standard industry practice. Visual examinations may be augmented with soundings or other techniques appropriate for the type, condition, and treatment of the wooden poles, including borings to determine the location and extent of decay and excavation to determine the extent of decay at the groundline.
- Added an enhancement (new Enhancement 6) to require evaluation of inspection results to include consideration of the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation at such inaccessible areas.
- Added an enhancement (new Enhancement 7) to specify VT-1 inspections to identify cracking of stainless steel and aluminum components. Sample selection and inspection coverage will also be specified.
- Added an enhancement (new Enhancement 8) to specify inspection sample expansion requirements for cracking of stainless steel and aluminum components when one of the inspections does not meet inspection acceptance criteria.

SLRA Section B2.1.34, Section A1.34 and Table A4.0-1, Item 34 are supplemented, as shown in Enclosure 2, to include the program description and UFSAR Supplement revisions and enhancement revisions/additions described above.

42. Protective Coating Monitoring and Maintenance program (B2.1.36): Program Description Revision

The *Protective Coating Monitoring and Maintenance* program is revised to include the following details:

> "The program maintains and monitors the aging of Service Level 1 coatings consistent with Regulatory Guide 1.54, "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants"."

SLRA Section B2.1.36 and Section A1.36 are supplemented, as shown in Enclosure 2, to revise the program description and UFSAR Supplement as indicated above.

43. Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10CFR 50.49 Environmental Qualification Requirements program (B2.1.39): Program Description Revision and Enhancement Addition

The *Electrical Insulation for Inaccessible Medium-Voltage Power Cables Not Subject to 10CFR 50.49 Environmental Qualification Requirements* program description is revised to include a plant-specific inaccessible medium-voltage test matrix that documents inspection methods, test methods, and acceptance criteria for the in-scope inaccessible medium-voltage power cables will be developed based on operating experience.

SLRA Section B2.1.39 and SLRA Table A4.0-1, Item 39 are supplemented, as shown in Enclosure 2, to revise the program description and add an enhancement that includes the above discussion regarding a plant-specific inaccessible medium-voltage test matrix.

44. Appendix C - MRP-227-A Gap Analysis for PWR Vessel Internals Aging Management: Gap Analysis Tables Clarified/Revised

SLRA Appendix C, reactor vessel internals (RVI) information, is clarified/revised as follows:

- Unit 1 Support Pin Nuts
  a. Table C2.2-1, Parameter Screening Results, Note #1 and Table C3.3-4, Comparison: Risk Category Designations from MRP-191, Revision 1, and the Results from the SLR Expert Panel Review, Note 1 are revised to state Unit 1 support pin nuts are susceptible to age-related degradation (Reference ANP – 3574, Section 4.1.3).
  b. Table C3.3-3, SLR Expert Panel Review Results Table, Note #1 is revised to state that the degradation mechanisms for the Unit 1 support pin nuts are SCC and irradiation-enhanced stress relaxation/irradiation-enhanced creep (ISR/IC). The assigned inspection category of "X" is appropriate for VT-3 examination of peripheral locations. (See ANP-3574, Section 4.1.3)
- Core Barrel Flange Surface and Weld

  Table C3.3-3, SLR Expert Panel Review Results Table, core barrel flange component description is enhanced to state that the affected component is the surface, and that the upper flange weld is included with the category of "upper core barrel girth welds". The SLR inspection category was changed from "P" to "E".
- Core Barrel Outlet Nozzle

  Table C3.3-3, SLR Expert Panel Review Results Table, is revised to be consistent with MRP-227, Revision 1 which removed the expansion link from the

upper core barrel flange weld. Table 4-6 of MRP-227, Revision 1, indicates that this expansion item was deleted and replaced with three (3) expansion items for UGW, UAW, LFW. The SLR inspection category was changed from "E" to "N".

- Core Barrel Lower Flange Weld and Upper Girth Weld

  a. Table C3.3-3, SLR Expert Panel Review Results Table, for the line designated lower core barrel girth welds, the parenthetical LWF is removed and Note #5 is added. For the line designated upper core barrel girth welds, the parenthetical UGW is removed and Note #5 is added.

  b. Table C3.3-3, SLR Expert Panel Review Results Table, Note #5 is added to explain that MRP-227, revision 1 added expansion links from the upper flange weld (UFW) to the lower flange weld (LFW) and to the upper girth weld (UGW).

- Radial Support Keys

  Table C3.3-3, SLR Expert Panel Review Results Table, on the radial support keys with 304 stainless steel base metal, the SLR inspection category was incorrectly listed as "P" when it should have been "N". This change has been made (Reference: LTR-AMLR-17-35, Tables 14 and 15). Note: Table C3.3-3, Radial Support Keys: Stellite hard-facing surface correctly includes SLR inspection category "P", so no further change is needed.

- Core Barrel Flange

  Table C3.3-4, Comparison: Risk Category Designations from MRP-191, Revision 1, and the Results from the SLR Expert Panel Review, and Table C4.3-3, Existing Program Components, line item for core barrel flange has been clarified to mention "surface".

- Lower Support Forging

  Table CA3-2, Expansion Components, examination method has been corrected from VT-3 to EVT-1. (Reference: LTR-AMLR-17-35, Table 12).

- Lower Support Column Bodies

  Table C4.3-2, Expansion Components, examination method has been corrected from VT-3 to EVT-1. (Reference: LTR-AMLR-17-35, Table 12).

The following SLRA Appendix C Table components are supplemented, as shown in Enclosure 2, to incorporate the revisions/clarifications described above:

Component	Appendix C Section
Unit 1 Support Pin Nuts	Table C2.2-1
	Table C3.3-3
	Table C3.3-4
Core Barrel Flange Surface & Weld	Table C3.3-3
Core Barrel Outlet Nozzle	Table C3.3-3
Core Barrel Lower Flange Weld and Upper Girth Weld	Table C3.3-3
Radial Support Keys	Table C3.3-3
Core Barrel Flange	Table C3.3-4
	Table C4.3-4
Lower Support Forging	Table C4.3-2
Lower Support Column Bodies	Table C4.3-2

45. Leak-Before-Break, Update to SLRA Section 4.7.3

The WCAP-15550 reference in SLRA Section 4.7.3 has been revised to indicate revision 2. WCAP-15550 Revision 2 was issued to address updated CMTR data from Unit 1 that have not been considered in revision 1. Content errors on Table 4-6 and Table 4-7 have also also addressed.

SLRA Sections 4.7.3 and 4.8 are supplemented, as shown in Enclosure 2, to indicate WCAP-15550 Revision 2.