Enclosure A

Dresden Nuclear Power Station, Units 2 and 3,

Subsequent License Renewal Application

Affected Changes

Introduction

This enclosure contains 15 changes that are being made to the Subsequent License Renewal Application (SLRA) that were identified after its initial submission. For each item, a detailed description of the change is provided along with the affected page number(s) and specific portion(s) of the SLRA.

For clarity, entire sentences or paragraphs from the SLRA are provided with the deleted text highlighted by strikethroughs and the inserted text highlighted by ***bolded italics***. In addition, any revisions to the SLRA tables are shown by providing excerpts from the affected tables.

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<u>Change # 1 – Revisions to Structural Scoping and Screening Sections</u>

Affected SLRA sections: 2.4.3, 2.4.9, 2.4.14, Table 2.4-2, Table 2.4-4, Table 2.4-9, and Table 2.4-13

Affected SLRA Page Numbers: 2.4-7, 2.4-14, 2.4-20, 2.4-21, 2.4-38, 2.4-43, 2.4-61, 2.4-62

Description of Changes:

SLRA Table 2.4-2 is being revised to include component type “Supports for ASME Class 1, Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)” and “Stabilizers (reactor vessel to reactor shield wall)”.

SLRA Section 2.4.3 is being revised to clarify that the discharge headworks and the Units 2 and 3 Crib House forebay are within the scope of subsequent license renewal.

SLRA Table 2.4-4 is being revised to remove “(Unit 2 and 3 only)” where referenced for certain component types.

SLRA Section 2.4.9 is being revised to clarify the design of the reactor shield wall and reactor vessel support system.

SLRA Table 2.4-9 is being revised to clarify that the sliding surfaces within the Primary Containment Structure are for radial beam seats in the drywell, to add a line item for torus ring girders to match the discussion in Table 3.5-1 and to distinguish these ring girders from the ring girders under the reactor vessel, to clearly identify the ring girder under the reactor vessel skirt, and to clarify the truss arrangement for the reactor vessel lateral support.

SLRA Table 2.4-13 is being revised to clarify the list of subcomponents addressed by structural miscellaneous steel and to clarify that the penetration seal component type includes structural sealants and seismic joint fillers.

SLRA Section 2.4.14 is being revised to clarify that the foundation for transformer TR 86 is within the scope of subsequent license renewal.

Accordingly, SLRA Section 2.4.3, Section 2.4.9, Section 2.4.14, Table 2.4-2, Table 2.4-4, Table 2.4-9, and Table 2.4-13 are revised as shown below.

SLRA Table 2.4-2, Component Supports, Scoping and Screening Methodology Results, page 2.4-7, is revised as shown below:

Table 2.4-2
Component Supports
Components Subject to Aging Management Review

Component Type	Intended Function
Supports for ASME Class 1 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	***Structural Support***
Stabilizers (reactor vessel to reactor shield wall)	***Structural Support***

SLRA Section 2.4.3, Cooling Water Structures, the first paragraph of page 2.4-14, is revised as shown below:

> Included within the evaluation boundary of the Cooling Water Structures and determined to be within the scope of license renewal are the intake canals (including the associated bridge over the Units 2 and 3 intake canal)***, the discharge headworks, the Units 2 and 3 Crib House forebay,*** and the discharge outfall structure (including ice melt gate and deicing line connecting the discharge headworks to the Units 2 and 3 Crib House forebay). These structures and components are classified nonsafety-related but are functionally relied upon in the current licensing basis to directly support 10 CFR 54.4(a)(1) intended functions.

SLRA Table 2.4-4, Crib Houses Components Subject to Aging Management Review, pages 2.4-20 and 2.4-21 is revised as shown below:

Table 2.4-4
Crib Houses
Components Subject to Aging Management Review

Component Type	Intended Function
Concrete: Foundation (accessible) ~~(Unit 2 & 3 only)~~	Structural Support, Water Retaining Boundary
Concrete: Foundation (inaccessible) ~~(Unit 2 & 3 only)~~	Structural Support, Water Retaining Boundary
Hatches/Plugs ~~(Unit 2 & 3 only)~~	Missile Barrier, Shelter/Protection, Structural Support
Masonry walls: Above-grade exterior ~~(Unit 2 & 3 only)~~	Shelter/Protection, Structural Support
Masonry walls: Interior ~~(Unit 2 & 3 only)~~	Shelter/Protection, Structural Support
Precast Concrete - Beams and Panel ~~(Unit 2 & 3 only)~~	Missile Barrier, Structural Support
Steel Components: structural steel ~~(Unit 2 & 3 only)~~	Structural Support
Structural Miscellaneous - Siding, Closure Plate ~~(Unit 2 & 3 only)~~	Shelter/Protection

SLRA Section 2.4.9, Primary Containment, Scoping and Screening Methodology Results, pages 2.4-37 and 2.4-38 is revised as shown below:

Reinforced concrete structures inside the drywell include the drywell floor slab, ***and*** reactor pedestal~~, and the shield wall around the reactor~~. Inside the drywell, a portion of the lower spherical drywell shell is filled with concrete to form a floor above the bottom of the drywell. This floor slab is placed to provide a working base for supporting the reactor structures and components inside the drywell. The reactor pedestal is a reinforced concrete cylinder cast integrally with the concrete floor above the bottom of the drywell that provides structural support to the reactor ***vessel skirt***, ***the bottom of*** an annular shield wall around the reactor, and floor framing. The inside surface of the cylindrical ***reactor*** pedestal is lined with carbon steel plate. The inside and outside surfaces of the reactor shield wall ~~concrete~~ are formed with steel plate***s***~~.~~ ***that span between the steel columns. The interior spaces of the reactor shield wall are filled with unreinforced, non-structural concrete. Outside the bottom of the drywell, the drywell concrete pedestal and steel skirts that support the drywell are founded on the foundation slab of the Reactor Building. These continuous steel skirts transmit the loads into the Reactor Building foundation.***

~~The upper portion of the drywell is supported by stabilizers. There are also truss arrangements between the reactor and the reactor shield wall, between the reactor shield wall and the inside of the drywell, and between the outside of the drywell and containment shield wall. These systems transmit the upper lateral drywell loads to the Reactor Building. Outside the bottom of the drywell, the concrete pedestal and steel skirts that support the drywell are founded on the foundation slab of the Reactor Building. These continuous steel skirts transmit the loads into the Reactor Building foundation.~~ ***The top of the reactor shield wall is braced laterally by circular trusses to the inside of the drywell shell at the same elevation as the drywell shell is laterally braced to drywell reinforced concrete shield outside the drywell. The lateral braces at the top of the reactor vessel, top of the reactor shield wall, and top of the drywell shell limit horizontal displacement and resist seismic and jet reaction forces yet will permit radial and vertical expansion and contraction due to temperature and pressure changes. Vertical loads from the reactor vessel are transmitted to the drywell concrete pedestal and steel skirts through the reactor vessel skirt, reactor ring girder, and reactor pedestal. Lateral loads are transmitted to the building through lateral braces. The reactor vessel stabilizers are attached near the top third of the vessel and are connected to the top of the reactor shield wall. The reactor shield wall is braced at the top by a horizontal, circular tubular truss system. The lateral loads are transmitted through the truss system to the drywell shear lug mechanism. This shear lug mechanism permits vertical movement of the***

steel drywell but restricts rotational movement. However, lateral loads are transmitted through the shear lug mechanism to the heavy concrete envelope around the drywell which is part of the Reactor Building. Additionally, a portion of the lateral loads are transmitted from the reactor vessel to the vessel pedestal and then to the foundation.

SLRA Table 2.4-9, Primary Containment, Components Subject to Aging Management Review, page 2.4-43 is revised as shown below:

Table 2.4-9
Primary Containment
Components Subject to Aging Management Review

Component Type	Intended Function
Sliding Surfaces ***(drywell radial beam seats)***	Structural Support
Steel Components: ring girder assemblies ***(under reactor vessel skirt)***~~, stabilizers, and truss arrangements~~	Structural Support
Steel Components: stabilizers (truss arrangements between reactor shield wall to drywell)	***Structural Support***
Steel Elements: Torus – ring girders	***Structural Pressure Barrier, Structural Support, Water Retaining Boundary***

SLRA Table 2.4-13, Structural Commodity Group Components Subject to Aging Management Review, page 2.4-61 is revised as shown below:

Table 2.4-13
Structural Commodity Group
Components Subject to Aging Management Review

Component Type	Intended Function
Penetration Seals, seals, gaskets, ***structural sealants, seismic joint fillers,*** and moisture barriers (including caulking, flashing and other sealants)	Flood Barrier, HELB/MELB Shielding, Shelter/Protection, Shielding, Structural Pressure Barrier, Structural Support, Water Retaining Boundary
Penetration Sleeves	Flood Barrier, HELB/MELB Shielding, Shelter/Protection, Shielding, Structural Pressure Barrier, Structural Support, Water Retaining Boundary
Roofing	Shelter/Protection
Structural Miscellaneous- Siding	Shelter/Protection, Structural Pressure Barrier
Structural Miscellaneous- catwalks, grating, handrails, kick plates, ladders, platforms, stairs, ***steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, fixed louvers,*** etc.	Shelter/Protection, Structural Support

The fourth paragraph of SLRA Section 2.4.14, Switchyard Structures, page 2.4-62, is revised as shown below:

> The normal source of offsite power for each unit is supplied by the 345 kV switchyard through the reserve auxiliary transformers (RATs). Alignment through the RATs is credited for normal restoration of offsite power when recovering from station blackout. ***Additionally, transformer TR 86 is included in the Unit 2 primary current path for restoration of offsite power following a station blackout. The transformer concrete foundation is evaluated in the Switchyard Structures and determined to be within the scope of license renewal.*** Miscellaneous transmission and distribution structures associated with the reserve auxiliary transformers (such as bus duct covers, bus duct supports, dead-end structures, and transmission towers) and their associated reinforced concrete foundations (including crushed rock sumps around the transformers to contain oil if a leak should occur) are included as Switchyard Structures.

Change # 2 – Revision to Mechanical Summary of Aging Management Evaluations Tables

Affected SLRA sections: Table 3.2.1, Table 3.3.1, Table 3.4.1

Affected SLRA Page Numbers: 3.2-30, 3.2-45, 3.3-64, 3.4-39

Description of Changes:

SLRA Table 3.2.1, Item Number 16 is being revised to clarify that the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components aging management program is substituted for the One-Time Inspection program to manage the ECCS suction strainer and its associated flange. Supplement 1, Change # 32 previously addressed this substitution in SLRA Table 3.2.2-5.

SLRA Table 3.2.1, Item Number 73 discussion section is being revised to delete the second paragraph regarding substitution of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24) program for coated components.

SLRA Table 3.3.1, Item Number 40 is being revised to specify that exceptions apply to the NUREG-2191 recommendations for the Inspection of Water Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.

SLRA Table 3.4.1, Item Number 67 discussion paragraph is being revised to reference the Main Turbine and Auxiliaries System rather than the Condensate System in the discussion regarding substitution of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24) program for coated components.

Accordingly, SLRA Table 3.2.1, Table 3.3.1, and Table 3.4.1 are revised as shown below.

SLRA Table 3.2.1, Summary of Aging Management Evaluations for the Engineered Safety Features, page 3.2-30 is revised as shown below:

Table 3.2.1 Summary of Aging Management Evaluations for the Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-016	Steel piping, piping components exposed to treated water	Loss of material due to general, pitting, crevice corrosion, MIC	AMP XI.M2, "Water Chemistry," and AMP XI.M32, "One-Time Inspection"	No	Consistent with NUREG-2191 with exceptions. The One-Time Inspection (B.2.1.20) and Water Chemistry (B.2.1.2) program will be used to manage loss of material of the carbon or low alloy steel with stainless steel cladding, carbon steel, and cast iron heat exchanger components, piping, piping components, pump casings, reactor vessel flange leak detection line and valve bodies exposed to reactor coolant, steam and treated water in the Core Spray System, High Pressure Coolant Injection System, Isolation Condenser System, Low Pressure Coolant Injection System, Primary Containment Isolation System, and Reactor Coolant Pressure Boundary System. ***The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24) program has been substituted for the One-Time Inspection (B.2.1.20) program and will be used to manage loss of material of the carbon steel piping, piping components exposed to treated water in the Low Pressure Coolant Injection System.*** Exceptions apply to the NUREG-2191 recommendations for the Water Chemistry (B.2.1.2) program implementation.

SLRA Table 3.2.1, Summary of Aging Management Evaluations for the Engineered Safety Features, page 3.2-45 is revised as shown below:

Table 3.2.1 Summary of Aging Management Evaluations for the Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.2.1-073	Any material piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed-cycle cooling water, raw water, treated water, treated borated water, lubricating oil	Loss of material due to general, pitting, crevice corrosion, MIC	AMP XI.M42, "Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	Consistent with NUREG-2191. The Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks (B.2.1.28) program will be used to manage loss of material of the carbon steel (with internal coatings) heat exchanger components exposed to treated water and condensation in the Isolation Condenser system. ~~The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24) program has been substituted for the Internal Coatings/Linings for In-Scope Piping, Piping Components, Heat Exchangers, and Tanks (B.2.1.28) program and will be used to manage loss of material of the carbon steel (with internal coatings) tanks exposed to lubricating oil in the Main Turbine and Auxiliaries System.~~

SLRA Table 3.3.1, Summary of Aging Management Evaluations for the Auxiliary Systems, page 3.3-64 is revised as shown below:

Table 3.3.1 Summary of Aging Management Evaluations for the Engineered Safety Features

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.3.1-040	Stainless steel piping, piping components exposed to raw water	Loss of material due to pitting, crevice corrosion, MIC; flow blockage due to fouling	AMP XI.M20, "Open-Cycle Cooling Water System"	No	Consistent with NUREG-2191. The Open-Cycle Cooling Water System (B.2.1.11) program will be used to manage flow blockage and loss of material of carbon or low alloy steel with stainless steel cladding and stainless steel expansion joints, flow devices, heat exchanger components, piping, piping components, pump casings, strainers, tanks, and valve bodies exposed to raw water in the Closed Cycle Cooling Water System, Diesel Generator and Auxiliaries System, Open Cycle Cooling Water System, Process Sampling and Radiation Monitoring System, and Safety-Related Ventilation System. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program has been substituted and will be used to manage loss of material of stainless steel bolting (structural) and concrete anchors exposed to raw water in the Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.4.1, Summary of Aging Management Evaluations for the Steam and Power Conversion, page 3.4-39 is revised as shown below:

Table 3.4.1 Summary of Aging Management Evaluations for the Steam and Power Conversion

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4.1-067	Any material piping, piping components, heat exchangers, tanks with internal coatings/linings exposed to closed cycle cooling water, raw water, treated water, lubricating oil	Loss of material due to general, pitting, crevice corrosion, MIC	AMP XI.M42, "Internal Coatings/Linings for In Scope Piping, Piping Components, Heat Exchangers, and Tanks"	No	The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24) has been substituted and will be used to manage loss of material of the carbon steel (with internal coatings) tanks exposed to lubricating oil in the ~~Condensate~~ ***Main Turbine and Auxiliaries*** System.

Change # 3 – Revision to Main Turbine and Auxiliaries System Summary of Aging Management Evaluation

Affected SLRA sections: Table 3.4.2-5

Affected SLRA Page Numbers: 3.4-98

Description of Changes:

SLRA Table 3.4.2-5, for component type Tanks (Turbine Oil Reservoirs), the NUREG-2191 and NUREG-2192 items are being revised to reference line items associated with the Steam and Power Conversion system grouping, with a lubricating oil environment and loss of material aging effect.

Accordingly, SLRA Table 3.4.2-5 is revised as shown below.

SLRA Table 3.4.2-5, Main Turbine and Auxiliaries System Summary of Aging Management Evaluation, page 3.4-98 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Tanks (Turbine Oil Reservoirs)	Leakage Boundary	Carbon Steel (with Internal Coatings)	Lubricating Oil (Internal)	Loss of Material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.1.24)	~~V.D2.E-414~~ ***VIII.E.S-414***	~~3.2.1-073~~ ***3.4.1-067***	E, 1

<u>Change # 4 – Revision to Structures and Component Supports Table 1</u>

Affected SLRA sections: Table 3.5.1

Affected SLRA Page Numbers: 3.5-73, 3.5-74, 3.5-77, 3.5-78, 3.5-79, 3.5-80, 3.5-81, 3.5-83, 3.5-86, 3.5-88, 3.5-90, 3.5-93, 3.5-96, 3.5-97, 3.5-98, 3.5-101, 3.5-102

Description of Changes:

SLRA Table 3.5.1, Item Number 44 is being revised to clarify that cracking and distortion due to increased stress levels from settlement applies to the Yard Structures and the Switchyards Structures.

SLRA Table 3.5.1, Item Number 46 is being revised to reference Item Number 3.5.1-044 for aging effects due to settlement.

SLRA Table 3.5.1, Item Number 49 is being revised to include above grade exterior concrete exposed to air-outdoor.

SLRA Table 3.5.1, Item Number 55 is being revised to clarify that this line item addresses concrete and grout rather than reinforced concrete and grout.

SLRA Table 3.5.1, Item Number 56 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 58 being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 59 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 60 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 61 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 62 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 63 is being revised to remove reference to the Cooling Water Structures.

SLRA Table 3.5.1, Item Number 64 is being revised to remove reference to the Cooling Water Structures.

SLRA Table 3.5.1, Item Number 66 is being revised to remove reference to the Cooling Water Structures.

SLRA Table 3.5.1, Item Number 72 is being revised to clarify that the seals addressed by this line item include structural sealants and seismic joint fillers.

SLRA Table 3.5.1, Item Number 77 is being revised to remove reference to trash racks, grills, and gates; remove reference to the Crib Houses; and to clarify the language related to the reactor vessel support system.

SLRA Table 3.5.1, Item Number 80 is being revised to reference the Crib Houses and address carbon steel in structural applications such as concrete embedments, trash racks, grills, gates, siding, closure plates, and hatches/plugs.

SLRA Table 3.5.1, Item Number 83 is being revised to specify that the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program includes an exception to NUREG-2191 guidance.

SLRA Table 3.5.1, Item Number 90 is being revised to address supports for ASME Class 1 piping and components.

SLRA Table 3.5.1, Item Number 91 is being revised to reference the Primary Containment.

SLRA Table 3.5.1, Item Number 92 is being revised to address steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, and fixed louvers in addition to other miscellaneous structural steel components.

SLRA Table 3.5.1, Item Number 93 is being revised to address steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, and fixed louvers in addition to other miscellaneous structural steel components.

SLRA Table 3.5.1, Item Number 99 is being revised to address stainless steel bolting in supports for ASME Class 2 and 3 piping and components and to clarify the language regarding the reactor vessel lateral supports.

SLRA Table 3.5.1, Item Number 100 is being revised to address steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, and fixed louvers in addition to other miscellaneous structural steel components.

Accordingly, SLRA Table 3.5.1 is revised as shown below.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-73 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-044	All Groups: concrete: all	Cracking and distortion due to increased stress levels from settlement	AMP XI.S6, "Structures Monitoring"	Yes	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage cracking and distortion of reinforced concrete in all inaccessible areas exposed to a groundwater/soil environment ***for Yard Structures and Switchyards Structures***. See Subsection 3.5.2.2.2.1.3.
3.5.1-045	This Item Number is not used in NUREG-2192.				
3.5.1-046	Groups 1-3, 5-9: concrete: foundation; subfoundation	Reduction of foundation strength and cracking due to differential settlement and erosion of porous concrete subfoundation	AMP XI.S6, "Structures Monitoring"	Yes	Not Used. ***The aging effects due to settlement are managed under Item Number 3.5.1-044.*** See Subsection 3.5.2.2.2.1.3.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-74 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-049	Groups 6 - concrete (inaccessible areas): exterior above- and below-grade; foundation; interior slab	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Plant-specific aging management program or AMP XI.S6, “Structures Monitoring,” enhanced as necessary	Yes	Consistent with NUREG-2191 as supplemented by SLR-ISG-2021-03-STRUCTURES. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material (spalling, scaling) and cracking of concrete and reinforced concrete in below-grade exterior***, above-grade exterior,*** and inaccessible areas (including foundations) as well as deicing line encasement exposed to a groundwater/soil ***and air-outdoor*** environment. See Subsection 3.5.2.2.2.3.1.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-77 is revised as shown below:

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-055	Building concrete at locations of expansion and grouted anchors; grout pads for support base plates	Reduction in concrete anchor capacity due to local concrete degradation/ service- induced cracking or other concrete aging mechanisms	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage reduction in concrete anchor capacity of ***concrete and grout*** ~~reinforced concrete and grout~~ in supports for ASME Class 1, 2, 3, and MC piping and components, emergency diesel generator, HVAC system components, other miscellaneous mechanical equipment, platforms, pipe whip restraints, jet impingement shields, masonry walls, other miscellaneous structures, raceways, cable trays, conduit, HVAC ducts, tube track, instrument tubing, non-ASME piping and components, racks, panels, cabinets, and enclosures for electrical equipment and instrumentation (including building concrete at locations of expansion and grouted anchors, grout pads for support base plates, and embedments) exposed to air - indoor uncontrolled and air - outdoor in the Component Supports.

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-056	Concrete: exterior above- and below- grade; foundation; interior slab	Loss of material due to abrasion; cavitation	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage loss of material of concrete and reinforced concrete in above-grade exterior, below-grade exterior, interior, accessible and inaccessible (including foundations) as well as earthen water-control structures: (including embankments and canals) and equipment supports and foundations exposed to water - flowing environments in the Cooling Water Structures and Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-78 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-058	Earthen water-control structures: dams; embankments; reservoirs; channels; canals and ponds	Loss of material; loss of form due to erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, seepage	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage loss of material and loss of form of soil, rip-rap, gravel, and rock in earthen water-control structures (including embankments and canals) exposed to air - outdoor and water - flowing environments in the Cooling Water Structures. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-79 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-059	Group 6: concrete (accessible areas): all	Cracking; loss of bond; and loss of material (spalling, scaling) due to corrosion of embedded steel	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage cracking, loss of bond, and loss of material (spalling, scaling) of reinforced concrete in above-grade exterior, below-grade exterior, interior and accessible areas (including foundations), as well as curbs, equipment supports and foundations, hatches/plugs, and precast concrete beams and panels exposed to air - indoor uncontrolled, air - outdoor and water - flowing environments in the Cooling Water Structures and Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-060	Group 6: concrete (accessible areas): exterior above- and below-grade; foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage loss of material (spalling, scaling) and cracking of the concrete and reinforced concrete in above-grade and accessible areas as well as curbs, earthen water-control structures (including embankments and canals), and precast concrete beams and panels exposed to air - outdoor in the Cooling Water Structures and Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-80 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-061	Group 6: concrete (accessible areas): exterior above- and below-grade; foundation; interior slab	Increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage increase in porosity and permeability, and loss of strength of concrete and reinforced concrete in above-grade exterior, below-grade exterior, interior, and accessible areas (including foundation) as well as curbs, earthen water-control structures (including embankments, canals), equipment supports and foundations, deicing line encasement, and precast concrete beams and panels exposed to water - flowing and water - standing environments in the Cooling Water Structures and Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-062	Group 6: Wooden Piles; sheeting	Loss of material; change in material properties due to weathering, chemical degradation, and insect infestation repeated wetting and drying, fungal decay	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage loss of material and change in material properties of the treated wood stop logs exposed to air - outdoor and water - flowing environments in the Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-81 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-063	Groups 1-3, 5, 7-9: concrete (accessible areas): exterior above- and below-grade; foundation	Increase in porosity and permeability; loss of strength due to leaching of calcium hydroxide and carbonation	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage increase in porosity and permeability, and loss of strength of reinforced concrete in above-grade exterior and accessible areas (including basemat, foundation, and subfoundation) as well as curbs, hatches/plugs, and precast concrete beams and panels exposed to water - flowing environments in the ~~Cooling Water Structures,~~ Diesel Generator & HPCI Building, Isolation Condenser Pump House, Radwaste Structures, Reactor Building, Stacks, Switchyard Structures, Turbine Building, and Yard Structures.

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-064	Groups 1-3, 5, 7-9: concrete (accessible areas): exterior above- and below-grade; foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material (spalling, scaling) and cracking of reinforced concrete in above-grade exterior, interior, and accessible areas (including basemat, foundation, and subfoundation) as well as curbs, equipment supports and foundations, hatches/plugs, manhole/valve enclosures, manholes, handholes & duct banks, and precast concrete beams and panels exposed to air - outdoor in the ~~Cooling Water Structures,~~ Diesel Generator & HPCI Building, Isolation Condenser Pump House, Radwaste Structures, Reactor Building, Stacks, Switchyard Structures, Turbine Building, and Yard Structures.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-83 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-066	Groups 1-5, 7, 9: concrete (accessible areas): interior and above-grade exterior	Cracking; loss of bond; and loss of material (spalling, scaling) due to corrosion of embedded steel	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage cracking, loss of bond, and loss of material (spalling, scaling) of reinforced concrete in above-grade exterior, interior, and accessible areas (including basemat, foundation, subfoundation, drywell floor, reactor pedestal, steam tunnel, and reactor shield wall) as well as curbs, equipment supports and foundations, hatches/plugs, manhole/valve enclosures, manholes, handholes & duct banks, and precast concrete beams and panels exposed to air - indoor uncontrolled and air - outdoor in the ~~Cooling Water Structures,~~ Diesel Generator & HPCI Building, Isolation Condenser Pump House, Main Control Room and Auxiliary Electric Equipment Room, Primary Containment, Radwaste Structures, Reactor Building, Stacks, Switchyard Structures, Turbine Building, and Yard Structures.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-86 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-072	Seals; gasket; moisture barriers (caulking, flashing, and other sealants)	Loss of sealing due to wear, damage, erosion, tear, surface cracks, other defects	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of sealing of elastomers in expansion joints, roofing, seals, gaskets, ***structural sealants, seismic joint fillers,*** and moisture barriers (including caulking, flashing and other sealants) and supports associated with emergency diesel generator, HVAC system components, and other miscellaneous mechanical equipment (including support members, welds, bolted connections, and support anchorage to building structure) exposed to air - indoor uncontrolled, air - outdoor, and groundwater/soil in the Component Supports and Structural Commodity Group.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-88 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-077	Steel components: all structural steel	Loss of material due to corrosion	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material of carbon steel and galvanized steel in concrete elements (embedments), equipment supports and foundations, hatches/plugs, manhole/valve enclosures, manholes, handholes & duct banks, pipe whip restraints and jet impingement shields, steel components (including ~~trash rack, grills, gates,~~ ring girder assemblies, ***stabilizers (truss arrangements between reactor shield wall to drywell)***~~, truss arrangements~~, Reactor Building vent stack, transmission towers), steel elements (including liners, anchors, and integral attachments for reactor pedestal and reactor shield wall and the refueling bulkhead, ***ring girder under reactor vessel skirt***) and other miscellaneous structural applications (including ~~closure plates,~~ siding, and blowout panels) exposed to air - indoor uncontrolled and air - outdoor in the ~~Crib Houses,~~ Diesel Generator & HPCI Building, Isolation Condenser Pump House, Main Control Room and Auxiliary Electric Equipment Room, Primary Containment, Radwaste Structures, Reactor Building, Stacks, Switchyard Structures, Turbine Building, and Yard Structures.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-90 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-080	Structural bolting	Loss of material due to general, pitting, crevice corrosion	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material of carbon and low alloy steel and galvanized bolting in structural applications, concrete elements (anchors), and component supports associated with emergency diesel generator, HVAC system components, and other miscellaneous mechanical equipment, platforms, pipe whip restraints, jet impingement shields, masonry walls, and other miscellaneous structures, raceways, cable trays, conduit, HVAC ducts, tube track, instrument tubing, and non-ASME piping and components, racks, panels, cabinets, and enclosures for electrical equipment and instrumentation, ***as well as carbon steel in structural applications such as concrete embedments, trash racks, grills, gates, siding, closure plates, and hatches/plugs,*** exposed to air - indoor uncontrolled, and air - outdoor in the Component Supports, ***Crib Houses,*** Cooling Water Structures, Diesel Generator & HPCI Building, Isolation Condenser Pump House, Main Control Room and Auxiliary Electric Equipment Room, Primary Containment, Radwaste Structures, Reactor Building, Structural Commodity Group, Switchyard Structures, and Turbine Building.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-93 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-083	Structural bolting	Loss of material due to general, pitting, crevice corrosion	AMP XI.S7, "Inspection of Water-Control Structures Associated with Nuclear Power Plants" or the FERC/US Army Corp of Engineers dam inspections and maintenance programs.	No	Consistent with NUREG-2191 ***with exceptions***. The Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program will be used to manage loss of material for carbon and low alloy steel and galvanized bolting in structural applications and concrete elements (anchors) as well as galvanized steel, carbon steel, and cast iron in other structural applications (including embedments in concrete, ice melt gate and deicing line, trash rack, grills, and gates) exposed to air - indoor uncontrolled, air - outdoor, raw water, and water - flowing environments in the Circulating Water Inlet Tunnel, Cooling Water Structures and Crib Houses. ***Exceptions apply to the NUREG-2191 recommendations for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program implementation.***

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-96 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports					
Item Number	**Component**	**Aging Effect/Mechanism**	**Aging Management Programs**	**Further Evaluation Recommended**	**Discussion**
3.5.1-090	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general (steel only), pitting, crevice corrosion	AMP XI.M2, "Water Chemistry," and AMP XI.S3, "ASME Section XI, Subsection IWF"	No	Consistent with NUREG-2191 with exceptions. The ASME Section XI, Subsection IWF (B.2.1.30) and Water Chemistry (B.2.1.2) programs will be used to manage loss of material of carbon steel and stainless steel supports for ASME Class ***1,*** 2, 3, and MC piping and components (including constant and variable load spring hangers, rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames, bolting, support members, welds, bolted connections, support anchorage to building structure, clevis pins, and vent system supports) as well as supports for platforms, pipe whip restraints, jet impingement shields, masonry walls, and other miscellaneous structures exposed to treated water in the Component Supports. The Structures Monitoring (B.2.1.33) program is substituted to manage loss of material of carbon steel support members exposed to treated water in the Component Supports. Exceptions apply to the NUREG-2191 recommendations for Water Chemistry (B.2.1.2) program implementation.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-97 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-091	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general, pitting corrosion	AMP XI.S3, "ASME Section XI, Subsection IWF"	No	Consistent with NUREG-2191. The ASME Section XI, Subsection IWF (B.2.1.30) program will be used to manage loss of material of carbon steel supports for ASME Class 1, 2, 3, and MC piping and components (including constant and variable load spring hangers, rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames, bolting, sliding surfaces, support members, welds, bolted connections, support anchorage to building structure, clevis pins, and vent system supports) exposed to air - indoor, uncontrolled in the Component Supports ***and Primary Containment***.
3.5.1-092	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general, pitting corrosion	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material of carbon steel for support members, welds, bolted connections, support anchorage to building structure, conduit, doors, panels, racks, frames, cabinets, other enclosures, penetration sleeves, catwalks, grating, handrails, kick plates, ladders, platforms, stairs, ***steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, fixed louvers,*** and siding exposed to air – indoor uncontrolled, and air – outdoor in the Component Supports and Structural Commodity Group.

SLRA Table 3.5.1, Summary of Aging Management Evaluation for the Structures and Component Supports, page 3.5-98 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-093	Galvanized steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting, crevice corrosion	AMP XI.S6, "Structures Monitoring"	No	Consistent with NUREG-2191. The Structures Monitoring (B.2.1.33) program will be used to manage loss of material of galvanized steel for supports associated with emergency diesel generator, HVAC system components, and other miscellaneous mechanical equipment, platforms, pipe whip restraints, jet impingement shields, masonry walls, and other miscellaneous structures, raceways, cable trays, conduit, HVAC ducts, tube track, instrument tubing, and non-ASME piping and components, racks, panels, cabinets, and enclosures for electrical equipment and instrumentation (including support members, welds, bolted connections, and support anchorage to building structure), cable trays, conduit, doors, penetration sleeves, miscellaneous structural applications (including catwalks, grating, handrails, kick plates, ladders, platforms, ~~and~~ stairs***, steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, and fixed louvers***), tube track, non-Category 1 structures, and hatches/plugs exposed to air – outdoor in the Component Supports, Stacks, Structural Commodity Group, and Switchyard Structures.

SLRA Table 3.5.1, Summary of Aging Management Evaluations for the Structures and Component Supports, page 3.5-101 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-099	Aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion, cracking due to SCC	AMP XI.M32, "One-Time Inspection," AMP XI.S3, "ASME Section XI, Subsection IWF," or AMP XI.M36, "External Surfaces Monitoring of Mechanical Components"	Yes	Consistent with NUREG-2191. The ASME Section XI, Subsection IWF (B.2.1.30) program will be used to manage cracking and loss of material of stainless steel bolting in supports for ASME Class 1***, 2, and 3*** piping and components (including constant and variable load spring hangers, rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames, support members, welds, bolted connections, and support anchorage to building structure) and stainless steel supports for ASME ~~c~~ ***C***lass ***1,*** 2***,*** and 3 piping and components ***and stabilizers (reactor vessel to reactor shield wall)*** exposed to an air - indoor uncontrolled environment. See Subsection 3.5.2.2.2.4.

SLRA Table 3.5.1, Summary of Aging Management Evaluation for the Structures and Component Supports, page 3.5-102 is revised as shown below:

Table 3.5.1 Summary of Aging Management Evaluations for the Structures and Component Supports

Item Number	Component	Aging Effect/Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.5.1-100	Aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion, cracking due to SCC	AMP XI.M32, "One-Time Inspection," AMP XI.S6, "Structures Monitoring," or AMP XI.M36, "External Surfaces Monitoring of Mechanical Components"	Yes	Consistent with NUREG-2191. The External Surfaces Monitoring of Mechanical Components (B.2.1.23), One-Time Inspection (B.2.1.20), and Structures Monitoring (B.2.1.33) programs will be used to manage cracking and loss of material of aluminum and stainless steel in concrete elements (anchors), containment closure bolting, new fuel storage racks, hatches/plugs, thermal insulation jacketing (including clamps, bands, and fasteners), penetration sleeves, refueling bellows, miscellaneous structural applications (including catwalks, grating, handrails, kick plates, ladders, platforms, stairs, ***steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, fixed louvers,*** flood plates, siding, and closure plates), and supports associated with emergency diesel generator, HVAC system components, other miscellaneous mechanical equipment, platforms, pipe whip restraints, jet impingement shields, masonry walls, other miscellaneous structures, raceways, cable trays, conduit, HVAC ducts, tube track, instrument tubing, non-ASME piping and components, racks, panels, cabinets, and enclosures for electrical equipment and instrumentation (including support members, welds, bolted connections, and support anchorage to building structure) exposed to air - indoor uncontrolled and air - outdoor environments. See Subsection 3.5.2.2.2.4. The aluminum flood plates (in the Isolation Condenser Pump House) are constructed of 6061-T6 aluminum alloy, which is not susceptible to stress corrosion cracking.

Change # 5 – Revision to Structures and Component Supports Aging Management Review Summary Lists

Affected SLRA sections: 3.5.2.1.2, 3.5.2.1.9

Affected SLRA Page Numbers: 3.5-4, 3.5-5, 3.5-12, 3.5-13

Description of Changes:

SLRA Section 3.5.2.1.2 is being revised to include concrete as an applicable material, water-flowing as an applicable environment, and loss of fracture toughness as an applicable aging effect requiring management for the Component Supports commodity group.

SLRA Section 3.5.2.1.9 is being revised to include loss of fracture toughness as an applicable aging effect requiring management and ASME Section XI, Subsection IWF (B.2.1.30) as an applicable aging management program for the Primary Containment structure.

Accordingly, SLRA Sections 3.5.2.1.2 and 3.5.2.1.9 are revised as shown below.

SLRA Section 3.5.2.1.2, Component Supports, pages 3.5-4 and 3.5-5 is revised as shown below:

3.5.2.1.2 Component Supports

Materials

The materials of construction for the Component Supports components are:

- Aluminum
- Carbon and Low Alloy Steel Bolting
- Carbon Steel
- ***Concrete***
- Elastomer
- Galvanized Bolting
- Galvanized Steel
- Grout
- High Strength Low Alloy Steel Bolting with Yield Strength of 150 ksi or Greater
- Lubrite
- Reinforced concrete
- Stainless Steel
- Stainless Steel Bolting

Environments

The Component Supports components are exposed to the following environments:

- Air - Indoor, Uncontrolled
- Air - Outdoor
- Groundwater/Soil
- Treated Water
- ***Water - Flowing***

Aging Effect Requiring Management

The following aging effects associated with the Component Supports components require management:

- Cracking
- Increase in Porosity and Permeability
- Loss of Bond
- ***Loss of Fracture Toughness***
- Loss of Material
- Loss of Material (Spalling, Scaling)
- Loss of Mechanical Function
- Loss of Preload
- Loss of Sealing
- Reduction in Concrete Anchor Capacity
- Reduction or Loss of Isolation Function

The list of Aging Effects Requiring Management and Aging Management Programs in SLRA Section 3.5.2.1.9, Primary Containment, Aging Management Review Results, pages 3.5-12 and 3.5-13 are revised as shown below:

Aging Effect Requiring Management

The following aging effects associated with the Primary Containment components require management:

- Cracking
- Cumulative Fatigue Damage
- Loss of Bond
- Loss of Coating or Lining Integrity
- ***Loss of Fracture Toughness***
- Loss of Leaktightness
- Loss of Material
- Loss of Material (Spalling, Scaling)
- Loss of Mechanical Function
- Loss of Preload
- Loss of Sealing
- Loss of Mechanical Properties
- Reduction in Strength
- Various Aging Effects

Aging Management Programs

The following aging management programs manage the aging effects for the Primary Containment components:

- 10 CFR Part 50, Appendix J (B.2.1.31)
- ASME Section XI, Subsection IWE (B.2.1.29)
- ***ASME Section XI, Subsection IWF (B.2.1.30)***
- One-Time Inspection (B.2.1.20)
- Protective Coating Monitoring and Maintenance (B.2.1.35)
- Structures Monitoring (B.2.1.33)

- TLAA

<u>Change # 6 – Revision to Further Evaluations for Structures and Component Supports</u>

Affected SLRA sections: 3.5.2.2.1.2, 3.5.2.2.2.1, 3.5.2.2.2.2, 3.5.2.2.2.3, and 3.5.2.2.2.6

Affected SLRA Page Numbers: 3.5-22, 3.5-41, 3.5-42, 3.5-43, 3.5-44, 3.5-45, 3.5-46, 3.5-47, 3.5-48, 3.5-55, 3.5-56, 3.5-57, 3.5-58

Description of Changes:

SLRA Section 3.5.2.2.1.2 is being revised to include a summary of local concrete temperatures at the location of hot piping line penetrations to demonstrate that local concrete temperatures do not exceed 200 degrees Fahrenheit.

SLRA Section 3.5.2.2.2.1 is being revised to clarify that DNPS does not have concrete tanks or concrete missile barriers categorized as group 7 structures, to provide a summary of operating experience related to potential loss of material (spalling, scaling) and cracking due to freeze-thaw, to clarify that Group 4 structures include internal containment structures that are not susceptible to cracking and distortion due to increased stress levels from settlement, to clarify that Primary Containment is not subject to a water-flowing environment, and to provide a summary of operating experience related to potential increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide and carbonation.

SLRA Section 3.5.2.2.2.2 is being revised to provide additional information regarding air temperatures in Group 4 structures.

SLRA Section 3.5.2.2.2.3 is being revised to include reference to the Cooling Water Structures, provide additional information regarding the Circulating Water Inlet Tunnel to demonstrate that freeze thaw is not a concern, to provide a summary of operating experience related to potential loss of material (spalling, scaling) and cracking due to freeze-thaw, and to clarify that both above and below grade inaccessible concrete areas of Group 6 structures are addressed.

SLRA Section 3.5.2.2.2.6 is being revised to provide a summary of inspection results of reactor vessel support and reactor shield wall structural steel, to clarify the design of the reactor vessel support system, to clarify that the reactor shield wall concrete is non-structural, and to clarify that the initial nil ductility transition temperature value is not available for the ASTM A36 steel utilized for the inner and outer liners for the reactor shield wall.

Accordingly, SLRA Sections 3.5.2.2.1.2, 3.5.2.2.2.1, 3.5.2.2.2.2, 3.5.2.2.2.3, and 3.5.2.2.2.6 are revised as shown below.

SLRA Section 3.5.2.2.1.2, Reduction of Strength and Modulus Due to Elevated Temperature, page 3.5-22 is revised as shown below:

Table 3.5.1 Item Number 3.5.1-003 is not applicable to the DNPS Mark I steel containments. The concrete containment component types described for this item number do not exist at DNPS. As stated in SLRA Section 3.5.2.2.1.1, DNPS does not have an ASME Section XI, Subsection IWL program. However, the temperature criteria identified in this section apply to all concrete. Station areas that bound high temperature considerations are the drywell general area and reactor shield wall piping penetration local area.

The DNPS Technical Specifications limit drywell average air temperature during normal station operation to 150 degrees Fahrenheit. The bulk air temperature is maintained within the Technical Specification limits by recirculating air through the Drywell Ventilation System. As stated in UFSAR Section 6.2.1.2.1, the nominal bulk temperature in the drywell is approximately 135°F to 150°F during station operation.

A concrete temperature evaluation was performed at three locations to determine if there were concrete structures in scope that are subjected to elevated temperatures requiring supplemental aging management. The locations were: 1) the drywell shield wall that is part of the Reactor Building; 2) the wall between the Reactor Building and the Turbine Building; and 3) the reactor shield wall. The evaluation estimated concrete temperature increase due to the hot penetrating pipes above the normal room temperatures. In general, it was determined that the pipe penetration details do not result in concrete temperatures that exceed the threshold limits due to the penetration details that provide significant air spaces between the pipes and the concrete.

A concrete temperature evaluation was performed for the hot piping penetrations into the drywell shield wall going to the Reactor Building, and at the wall between the Reactor Building and the Turbine Building. Main steam piping was utilized as the bounding penetration with the highest possible thermal impact on the concrete surrounding the penetrations. The penetration in the drywell shield wall in the Reactor Building was calculated employing inputs such as the main steam line design temperature and the maximum drywell bulk average temperature technical specification limit of 150 degrees Fahrenheit, maintained during normal operation by the drywell ventilation system. The concrete at this penetration experiences a maximum local area temperature of less than 160 degrees Fahrenheit, well below the threshold of 200 degrees Fahrenheit. The drywell ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.8. The reactor building ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.5. The penetration at the wall between the Reactor Building and the Turbine Building was calculated employing inputs such as the main steam line design temperature and the Turbine Building ambient temperature of 120 degrees Fahrenheit maintained during normal operation by the turbine building ventilation system. The concrete at this penetration experiences a maximum local area temperature of less than 140 degrees Fahrenheit, well

below the threshold of 200 degrees Fahrenheit. The reactor building ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.5. The turbine building ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.4.

Although the reactor shield wall concrete is nonstructural in nature, the temperature evaluation was performed utilizing the reactor recirculation piping as the bounding penetration. The concrete at this penetration experiences a maximum local area temperature of less than 160 degrees Fahrenheit, well below the threshold of 200 degrees Fahrenheit. The interior spaces of the reactor shield wall are filled with unreinforced, non-structural concrete, therefore, reduction of strength and modulus due to elevated temperature is not an aging effect requiring management for this structure. The drywell ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.8.

The first paragraph in SLRA Section 3.5.2.2.2.1-1, Aging Management of Inaccessible Areas, page 3.5-41 is revised as shown below:

> Table 3.5.1 Item Number 3.5.1-042 evaluates the loss of material (spalling, scaling) and cracking due to freeze-thaw for concrete structures. This aging effect (and mechanism) is applicable to normally inaccessible concrete exposed to groundwater/soil and air – outdoor environments. DNPS is located in a region where weathering conditions are considered severe as shown in ASTM C33, "Standard Specification for Concrete Aggregates." The Structures Monitoring (B.2.1.33) program will be used to manage loss of material (spalling, scaling) and cracking in both accessible and inaccessible areas of Group 1, 2, 3, and 9 structures. There are no structures categorized as Group 5 per NUREG-2191 that are not enclosed by the Reactor Building at DNPS, which is evaluated as a Group 2 structure. Similarly, DNPS does not have any concrete structures categorized as Groups 7 and 8 per NUREG-2191. ***DNPS does not have concrete tanks or concrete missile barriers categorized as group 7 structures requiring aging management. Concrete foundations for group 8 structures within the scope of subsequent license renewal are evaluated for aging management in Yard Structures Table 3.5.2-16.*** Significant portions of the in-scope structures are accessible, which provides indications of reinforced concrete conditions in inaccessible areas.

The third paragraph in SLRA Section 3.5.2.2.2.1-1, Aging Management of Inaccessible Areas, page 3.5-41 is revised as shown below:

> Structural reinforced concrete has not exhibited significant loss of material (spalling, scaling) and cracking due to freeze-thaw in accessible areas of in scope reinforced concrete structures. ***Where indications of potential loss of material (spalling, scaling) and cracking due to freeze-thaw have been identified, the indications have consisted of small, isolated areas of relatively shallow spalls and pop-outs when compared to the overall structural component, with reinforcing steel in good condition, and no significant change to overall structural cross-sections.*** This operating experience provides objective evidence that the design and construction of external reinforced concrete at DNPS has provided concrete with good freeze-thaw resistance. Although operating experience has not identified significant loss of material and cracking due to freeze-thaw, the Structures Monitoring (B.2.1.33) program includes inspection for these aging effects in the accessible areas. ***The inconsequential loss of material (spalling, scaling) and cracking due to freeze-thaw does not impact the intended functions of concrete structures.***

The first paragraph in SLRA Section 3.5.2.2.2.1-2, Aging Management of Inaccessible Areas, page 3.5-42 is revised as shown below:

> Table 3.5.1 Item Number 3.5.1-043 evaluates cracking due to expansion and reaction with aggregates for all concrete structures. This aging effect (and mechanism) is applicable to normally inaccessible portions of reinforced concrete structures at DNPS. The Structures Monitoring (B.2.1.33) program will be used to manage cracking due to expansion and reaction with aggregates in both accessible and inaccessible areas of reinforced concrete for the Group 1, 2, 3, 4, and 9 structures. There are no structures categorized as Group 5 per NUREG-2191 that are not enclosed by the Reactor Building at DNPS, which is evaluated as a Group 2 structure. Similarly, DNPS does not have any concrete structures categorized as Groups 7 and 8 per NUREG-2191. ***DNPS does not have concrete tanks or concrete missile barriers categorized as group 7 structures requiring aging management. Concrete foundations for group 8 structures within the scope of subsequent license renewal are evaluated for aging management in Yard Structures Table 3.5.2-16.*** Significant portions of the in-scope structures are accessible, which provides indications of reinforced concrete conditions in inaccessible areas.

The first paragraph on SLRA Section 3.5.2.2.2.1-3, Aging Management of Inaccessible Areas, page 3.5-43 is revised as shown below:

> Table 3.5.1 Item Number 3.5.1-044 evaluates cracking and distortion due to increased stress levels from settlement for concrete structures. This aging effect (and mechanism) is applicable to all concrete exposed to soil. The CLB for DNPS does not include a program to monitor concrete for settlement and a permanent dewatering system is not in place. There are no structures categorized as Group 5 per NUREG-2191 that are not enclosed by the Reactor Building at DNPS, which is evaluated as a Group 2 structure. Similarly, DNPS does not have any concrete structures categorized as Groups 7 and 8 per NUREG-2191. ***DNPS does not have concrete tanks or concrete missile barriers categorized as group 7 structures requiring aging management. Concrete foundations for group 8 structures within the scope of subsequent license renewal are evaluated for aging management in Yard Structures Table 3.5.2-16.*** This Table 3.5-1 Item Number does not apply to the Group 4 structures due to the Mark I containment design. ***The DNPS Mark 1 containment and its associated support is established on the Reactor Building foundation slab, which rests on solid rock as specified in UFSAR Section 2.5.4. Consequently, cracking and distortion from increased stress levels due to settlement are not applicable to Group 4 internal containment structures.***

The fourth paragraph on SLRA Section 3.5.2.2.2.1-3, Aging Management of Inaccessible Areas, page 3.5-44 is revised as shown below:

> As indicated above, DNPS foundation design does not utilize porous concrete foundation or subfoundation material. Thus, differential settlement and erosion of porous concrete subfoundations does not cause reduction in foundation strength and cracking in DNPS structures and Table 3.5.1 Item Number 3.5.1-046 is not used. ***Aging effects due to settlement are managed under Item Number 3.5.1-044.***

SLRA Section 3.5.2.2.2.1, Aging Management of Inaccessible Areas, pages 3.5-44 and 3.5-45 is revised as shown below:

Table 3.5.1 Item Number 3.5.1 047 evaluates increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide and carbonation for concrete structures. This aging effect (and mechanism) is applicable to normally inaccessible portions of reinforced concrete structures exposed to water flowing environments at DNPS. The Structures Monitoring (B.2.1.33) program will be used to manage the increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide and carbonation in both accessible and inaccessible areas of Group 1, 2, 3, and 9 structures. There are no structures categorized as Group 5 per NUREG 2191 that are not enclosed by the Reactor Building at DNPS, which is evaluated as a Group 2 structure. Similarly, DNPS does not have any concrete structures categorized as Groups 7 and 8 per NUREG 2191. This Table 3.5 1 Item Number does not apply to the Group 4 structures due to the Mark I containment design. ***Since the Primary Containment structure is completely enclosed and sheltered within the air - indoor environment of the Reactor Building. The Primary Containment is not subject to a water-flowing environment, which would be conducive to porosity and permeability due to leaching of calcium hydroxide and carbonation.*** Significant portions of the in scope structures are accessible, which provides indications of reinforced concrete conditions in inaccessible areas.

The same concrete specification was used for all structures at DNPS, including the Group 1, 2, 3, and 9 structures, such that these results are representative of the expected effects of leaching of calcium hydroxide and carbonation of all structures within the scope of license renewal. The DNPS structural concrete was constructed as recommended to minimize the potential effects of leaching of calcium hydroxide and carbonation. The original designs and construction of these structures conformed to ACI 318, “Building Code Requirements for Reinforced Concrete”, and ACI 301, “Specifications for Structural Concrete for Building.” The concrete mix design provides for low permeability by incorporating fly ash and approved water reducing admixtures. Concrete fine and coarse aggregates conform to ASTM C33. The cement is Type I and II, Portland cement conforming to ASTM C150. Water used for mixing concrete or processing concrete aggregates is free from any injurious amounts of acid, alkali, salts, oil, sediment, and organic matter.

However, increase in porosity and permeability and loss of strength due to leaching of calcium hydroxide and carbonation is applicable for a water flowing environment (which can include rainwater, raw water, groundwater, or water flowing under a foundation); therefore, the potential for rainwater or groundwater to flow over or collect on reinforced concrete surfaces is considered. Accessible areas can be used as an indicator of increase in porosity and permeability and loss of strength of reinforced concrete conditions in inaccessible areas for leaching of calcium hydroxide or carbonation. In addition, DNPS will continue to examine exposed portions of the below grade concrete, when excavated for any reason in accordance with the Structures Monitoring (B.2.1.33) program. ~~Some minor leaching of calcium hydroxide has been observed on DNPS reinforced concrete structures; however, it did not result in a loss of intended function.~~ ***Operating experience at DNPS, which inspects for concrete deterioration due to***

any aging effect and mechanism, has identified increases in porosity and permeability and loss of strength due to the effects of carbonation. Concrete degradation that would indicate a reduction in its structural integrity has not been identified. The inconsequential Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide and carbonation does not impact the intended functions of concrete structures.

SLRA Section 3.5.2.2.2.2, Reduction of Strength and Modulus Due to Elevated Temperature, page 3.5-46 is revised as shown below:

> Table 3.5.1 Item Number 3.5.1-048 is not applicable to DNPS. There are no structures categorized as Group 5 per NUREG-2191 that are not enclosed by the Reactor Building at DNPS, which is evaluated as a Group 2 structure. Group 1, 2 and 3 structures at DNPS are not subject to ~~a~~ general area normal temperatures greater than 150°F. In addition, local temperatures in excess of 200°F have not been reported at DNPS. Station operating experience has not identified elevated general or local area temperature as a concern for concrete structural components. As described in SLRA Section 3.5.2.2.2.1.2 above, concrete structural components located inside the drywell (which include the Group 4 structures for DNPS) are not subject to general area temperature greater than 150°F or local area concrete temperature greater 200°F. ***Station Technical Specifications limit the drywell average air temperature to below 150°F. The drywell ventilation system has been designed to maintain the drywell at an average temperature of 135°F during normal operations. The bulk average temperature for Group 4 structures is maintained within the Technical Specification limits by recirculating the drywell atmosphere through the drywell ventilation system coolers. The drywell ventilation system is addressed in SLRA Section 2.3.3.10, Table 3.3.2-10, and UFSAR Section 9.4.8.***

SLRA Section 3.5.2.2.2.3, Aging Management of Inaccessible Areas for Group 6 Structures, pages 3.5-47 and 3.5-48, is revised as shown below:

Table 3.5.1 Item Number 3.5.1-049 evaluates the loss of material (spalling, scaling) and cracking due to freeze-thaw for concrete structures. This aging effect (and mechanism) is applicable to normally inaccessible concrete exposed to groundwater/soil and air – outdoor environments. DNPS is located in a region where weathering conditions are considered severe as shown in ASTM C33, “Standard Specification for Concrete Aggregates.” The Structures Monitoring (B.2.1.33) program will be used to manage loss of material (spalling, scaling) and cracking due to freeze-thaw in both accessible and inaccessible areas of Group 6 structures. The susceptible Group 6 structures in the scope of this program consist of ***Cooling Water Structures and*** the Crib Houses. Additionally, unreinforced concrete fill is used to encase the deicing line and the underside of its distribution manifold from the ice melt gate at the discharge headworks to the Units 2 and 3 Crib House forebay. Significant portions of the Crib Houses and the discharge outfall structure are accessible, which provides indications of concrete conditions in the inaccessible areas. ***The Circulating Water Inlet Tunnel is evaluated within the Group 6 Structures and is not susceptible to loss of material (spalling, scaling) and cracking due to freeze-thaw. This stationary structure resides well below the frost line and is filled with river water from the Units 2 and 3 intake canal through the Units 2 and 3 Crib House.***

The original designs and construction of these structures conformed to ACI 318, “Building Code Requirements for Reinforced Concrete”, and ACI 301, “Specifications for Structural Concrete for Building.” The concrete mix design provides for low permeability by incorporating fly ash and approved water-reducing admixtures, with adequate air entrainment (not less than 3% nor more than 5%) in the air-outdoor environment such that the concrete has good freeze-thaw resistance.

Structural reinforced concrete has not exhibited significant loss of material (spalling, scaling) and cracking due to freeze-thaw in accessible areas of in scope reinforced concrete structures. ***Where indications of potential loss of material (spalling, scaling) and cracking due to freeze-thaw have been identified, the indications have consisted of small, isolated areas of relatively shallow spalls and pop-outs when compared to the overall structural component, with reinforcing steel in good condition, and no significant change to overall structural cross-sections.*** This operating experience provides objective evidence that the design and construction of external reinforced concrete at DNPS has provided concrete with good freeze-thaw resistance. Although operating experience has not identified significant loss of material (spalling, scaling) and cracking due to freeze-thaw, the Structures Monitoring (B.2.1.33) program includes inspection for these aging effects in the accessible areas. ***The inconsequential loss of material (spalling, scaling) and cracking due to freeze-thaw does not impact the intended functions of concrete structures.***

The visual inspections of reinforced concrete identify concrete damage in accordance with the requirements of the Structures Monitoring (B.2.1.33) program. If freeze-thaw damage were to occur, it would occur at the surface of concrete with significant moisture levels and sudden drops in temperature to below freezing. In general, these areas are exposed at the ground surface and are accessible for inspection. In addition, DNPS examines exposed portions of the below-grade concrete, when excavated for any reason, in accordance with the Structures Monitoring (B.2.1.33) program.

If unacceptable conditions due to freeze-thaw are identified in the accessible areas of structures, the conditions are evaluated and (depending upon the initial conditions and evaluation) corrective actions are developed that may include additional inspections to determine the extent of degraded conditions as part of the corrective action program. The condition of accessible and above grade concrete is used as an indicator for the condition of the inaccessible and below grade structural components and provides reasonable assurance that degradation of inaccessible structural components will be detected before a loss of an intended function.

The accessible DNPS Group 6 structures may be used as a leading indicator for exposure to weathering conditions for the other reinforced concrete structures that are in scope because of the higher level of water exposure.

As a result, the Structures Monitoring (B.2.1.33) program is expected to adequately manage the loss of material (spalling, scaling) and cracking due to freeze-thaw that could occur in ***above and*** below grade inaccessible concrete areas of Group 6 structures. Therefore, a plant-specific aging management program is not required to manage this aging effect.

SLRA Section 3.5.2.2.2.6, Reduction of Strength and Mechanical Properties of Concrete Due to Irradiation (as supplemented by SLR-ISG-2021-03-STRUCTURES), page 3.5-55 is revised as shown below:

<u>RPV Support Steel Evaluation</u>

DNPS has conducted visual inspections on various Reactor Vessel structural support components, including the Reactor Vessel support skirt, the skirt-to-ring girder bolting, and the ring girder steel. Minor surface corrosion with no loss of material was observed on the ring girder steel and bolting during the 2016 inspection for DNPS Unit 3. Previous inspections have not revealed any significant aging issues. Additionally, DNPS also inspects the stabilizers (reactor vessel to reactor shield wall and truss arrangements between reactor shield wall to drywell) and the drywell shear lug mechanism. Previous inspections have not revealed any significant aging issues. Moderate corrosion was noted during the 2019 inspection of the drywell shear lug mechanism, but no loss of material was detected. These components continue to be condition monitored to ensure age related degradation is identified and addressed promptly.

In addition to the potential aging effects due to irradiation of reinforced concrete, a loss (or reduction) in fracture toughness due to irradiation embrittlement of the RPV support steel is a potential aging effect considered. The RPV support structures at DNPS are described in UFSAR Section 3.9.3.1.1. The RPV support structures consist of a cylindrical skirt attached to the bottom of the RPV and lateral stabilizers at the top of the reactor shield wall. The top of the steel skirt is welded to the bottom of the RPV, which is well below the active core region. As shown on UFSAR Figure 3.9-2, the base of the skirt is continuously supported from the bottom by a concrete and steel pedestal, which carries the load through the drywell to the ~~r~~***R***eactor ~~b~~***B***uilding foundation slab. Stabilizer brackets, located below the vessel flange but well above the active core region, are connected to the top of the concrete and steel reactor shield wall as shown on UFSAR Figure 3.9-1. ***The top of the reactor shield wall is braced laterally by circular trusses to the inside of the drywell shell at the same elevation as the drywell shell is laterally braced to drywell reinforced concrete shield outside the drywell. The lateral braces at the top of the reactor vessel, top of the reactor shield wall, and top of the drywell shell limit horizontal displacement and resist seismic and jet reaction forces yet will permit radial and vertical expansion and contraction due to temperature and pressure changes. Vertical loads from the reactor vessel are transmitted to the drywell concrete pedestal and steel skirts through the reactor vessel skirt, reactor ring girder, and reactor pedestal. Lateral loads are transmitted to the building through lateral braces. The reactor vessel stabilizers are attached near the top third of the vessel and are connected to the top of the reactor shield wall. The reactor shield wall is braced at the top by a horizontal, circular tubular truss system. The lateral loads are transmitted through the truss system to the drywell shear lug mechanism. This shear lug mechanism permits***

vertical movement of the steel drywell but restricts rotational movement. However, lateral loads are transmitted through the shear lug mechanism to the heavy concrete envelope around the drywell which is part of the Reactor Building. Additionally, a portion of the lateral loads are transmitted from the reactor vessel to the vessel pedestal and then to the foundation. ~~The reactor shield wall in turn is anchored at the base to the top of the reactor pedestal and restrained at the top by a horizontal tubular truss system designed to permit axial expansion. The truss system transmits lateral loads through drywell shear lug mechanisms to the concrete structure (part of the reactor building) outside the drywell to limit horizontal vibration and to resist seismic and jet reaction forces.~~

SLRA Section 3.5.2.2.2.6, Reduction of Strength and Mechanical Properties of Concrete Due to Irradiation (as supplemented by SLR-ISG-2021-03-STRUCTURES), page 3.5-56 is revised as shown below:

Reactor Shield Wall Structural Steel Evaluation

In October 2002, during the Dresden Unit 3 outage, two cracks were discovered on the vertical seam/joint between two of the ¼" thick plates of the steel surface of the reactor shield wall. Based on subsequent inspection of the cracks, it was determined that they were an isolated and localized incident, since the welds above, below and between the cracks are all intact. Due to the nature and location of the cracks, it was concluded that propagation would not occur during the operating cycle. Through the corrective action program, a work order was issued to repair the cracks, holes were drilled on each end of the cracks and they were ground out and rewelded, this work was completed during the following outage in 2004. Subsequent inspections of the Unit 3 reactor shield wall have not identified any additional indications of cracking.

The physical conditions of the reactor shield wall structural steel is monitored by the Structures Monitoring program, which performs inspections of all levels of the drywell. Concrete elements, structural steel, equipment foundations and component supports are inspected and deficiencies are noted in the associated work orders and in the corrective action program, as applicable. All structural elements of the reactor shield wall continue to be inspected and have been noted as acceptable and capable of performing their intended function.

As with the RPV support steel addressed above, the potential for a loss (or reduction) in fracture toughness due to irradiation embrittlement of other nearby structural steel is also considered. Specifically, the potential effects of irradiation on steel elements of the reactor shield wall are addressed. The reactor shield wall is shown on UFSAR Figures 3.9-1 and 3.9-2 (labeled biological shield). As stated previously, the reactor shield wall is described in UFSAR Section 12.3.2.2.1. The reactor shield wall consists of a hollow ***steel*** cylinder of ordinary concrete circumscribing the RPV. ***The interior spaces of the reactor shield wall are filled with unreinforced, non-structural concrete.*** The inside and outside surfaces of this 2-foot thick concrete wall are formed with steel plate. ~~Reinforcing steel is used in the concrete to give structural strength.~~ The cylinder is continuously supported from the bottom by the same concrete and steel pedestal that supports the RPV.

SLRA Section 3.5.2.2.2.6, Reduction of Strength and Mechanical Properties of Concrete Due to Irradiation, pages 3.5-57 and 3.5-58 are revised as shown below:

> Information provided in NUREG-1509, Figure 3-1 utilizes available data to develop a bounding estimate of the expected NDT shift for different dpa values, including data that are representative of low-temperature, low-energy flux conditions. For the DNPS reactor shield wall with a peak inner diameter surface fluence equating to 1.93×10^{-4} dpa, the upper bound NDT temperature shift is 22.5°F. The 1/4-inch thick steel plates that form the inner and outer liners for the DNPS reactor shield wall are fabricated from steel conforming to ASTM A36 low carbon steel. ~~Based on information provided~~ ***Since plant-specific initial NDT values are not available, based on information provided*** in NUREG-1509, Tables 4-1 and 4-2, the initial NDT (plus 1.3 standard deviation) for this material is 39°F. Therefore, the NDT at EOL for the reactor shield wall steel (including the irradiation-induced NDT temperature shift) = 61.5°F. The required margin between the LST and NDT at EOL is 30°F as per Appendix R, ASME code Section XI. As a result, the permissible lowest service temperature for reactor shield wall steel is 91.5°F. This value is below the lowest service temperature surrounding the support skirt of 100°F discussed in EPRI 3002020999, January 2022, *Aging Management of Reactor Vessel (RV) Supports for Extended Operations*.

Change # 7 – Revision to Structures and Component Supports Summary of Aging Management Evaluation Tables

Affected SLRA sections: Table 3.5.2-1, Table 3.5.2-2, Table 3.5.2-3, Table 3.5.2-4, Table 3.5.2-9, Table 3.5.2-11, Table 3.5.2-13

Affected SLRA Page Numbers: 3.5-103, 3.5-105, 3.5-106, 3.5-107, 3.5-108, 3.5-109, 3.5-110, 3.5-111, 3.5-112, 3.5-113, 3.5-116, 3.5-118, 3.5-119, 3.5-120, 3.5-121, 3.5-122, 3.5-125, 3.5-126, 3.5-127, 3.5-128, 3.5-129, 3.5-130, 3.5-132, 3.5-133, 3.5-134, 3.5-135, 3.5-137, 3.5-138, 3.5-139, 3.5-140, 3.5-141, 3.5-164, 3.5-166, 3.5-167, 3.5-168, 3.5-179, 3.5-190, 3.5-192

Description of Changes:

SLRA Table 3.5.2-1 is being revised to change standard note C to D since an exception is being added for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program.

SLRA Table 3.5.2-2 is being revised to:

- Change the material to “Concrete, grout” for various support components.
- Add component type “ASME Class 1 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)”.
- Add component type “Stabilizers (reactor vessel to reactor shield)”.
- Revise the referenced NUREG-2191 line item for various components to better align with the NUREG-2191 Chapter III structure groupings.
- Delete reinforced concrete as a material for component type “Supports for ASME Class MC Components (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)”.
- Add the environment of water-flowing for galvanized steel cable trays in the Units 2 and 3 Crib House.
- Add plant-specific notes to provide additional information regarding certain changes described above.

SLRA Table 3.5.2-3 is being revised to:

- Change standard notes A to B and C to D for various components since an exception is being added for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program.
- Credit the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program instead of the Structures Monitoring (B.2.1.33) program for component type “Concrete: Above-grade exterior (accessible)” and component type “Precast Concrete Beams and Panels”.
- Revise the referenced NUREG-2191 line item for various components to better align with the NUREG-2191 Chapter III structure groupings.

SLRA Table 3.5.2-4 is being revised to:

- Change standard notes A to B and C to D for various components since an exception is being added for the Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program.
- Revise the referenced NUREG-2191 line item for various components to better align with the NUREG-2191 Chapter III structure groupings.

SLRA Table 3.5.2-9 is being revised to:

- Clarify that the sliding surfaces component type applies to the drywell radial beam seats.
- Distinguish between the ring girder under the reactor vessel skirt and torus ring girders addressed by the new component type “Steel Elements: Torus – ring girders”.
- Add component type “Steel Components: stabilizers (truss arrangements between reactor shield wall to drywell)” to more clearly define the reactor vessel stabilizer component.
- Add loss of fracture toughness as an applicable aging effect requiring management.
- Add plant-specific notes to provide additional information regarding certain changes described above.

SLRA Table 3.5.2-11 is being revised to change the referenced NUREG-2191 line item for the “Hatches/Plugs” component type to better align with the NUREG-2191 Chapter III structure groupings.

SLRA Table 3.5.2-13 is being revised to clarify that structural sealants and seismic joint fillers are included in the Penetration Seals component type and to clarify that steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, fixed louvers are included along with other miscellaneous structural steel components.

Accordingly, SLRA Table 3.5.2-1, Table 3.5.2-2, Table 3.5.2-3, Table 3.5.2-4, Table 3.5.2-9, Table 3.5.2-11, and Table 3.5.2-13 are revised as shown below.

SLRA Table 3.5.2-1, Circulating Water Inlet Tunnel, Summary of Aging Management Evaluation, page 3.5-103, is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Steel Components	Direct Flow	Carbon Steel	Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-105 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 1 Piping and Components (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	~~Reinforced~~ ~~c~~***C***oncrete***, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B1.1.TP-42	3.5.1-055	A

SLRA Table 3.5.2-2, Component Supports, Aging Management Review Results, page 3.5-106 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 1 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	*Structural Support*	*Carbon Steel*	*Air - Indoor, Uncontrolled*	*Loss of Material*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-24*	*3.5.1-091*	*A*
				Loss of Fracture Toughness	*ASME Section XI, Subsection IWF (B.2.1.30)*			*H, 3*
		Carbon and Low Alloy Steel Bolting	*Air - Indoor, Uncontrolled*	*Loss of Material*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.TP-226*	*3.5.1-081*	*A*
				Loss of Preload	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.TP-229*	*3.5.1-087*	*A*
				Loss of Fracture Toughness	*ASME Section XI, Subsection IWF (B.2.1.30)*			*H, 3*
		Stainless Steel	*Air - Indoor, Uncontrolled*	*Cracking*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*
				Loss of Material	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 1 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	*Structural Support*	*Stainless Steel Bolting*	*Air - Indoor, Uncontrolled*	*Cracking*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*
				Loss of Material	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*
				Loss of Preload	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.TP-229*	*3.5.1-087*	*A*

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Stabilizers (reactor vessel to reactor shield)	*Structural Support*	*Carbon Steel*	*Air - Indoor, Uncontrolled*	*Loss of Material*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-24*	*3.5.1-091*	*A*
				Loss of Fracture Toughness	*ASME Section XI, Subsection IWF (B.2.1.30)*			*H, 3*
		Stainless Steel	*Air - Indoor, Uncontrolled*	*Cracking*	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*
				Loss of Material	*ASME Section XI, Subsection IWF (B.2.1.30)*	*III.B1.1.T-36b*	*3.5.1-099*	*A*
				Loss of Fracture Toughness	*ASME Section XI, Subsection IWF (B.2.1.30)*			*H, 3*

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-107 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 2 and 3 Piping and Components (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	~~Reinforced~~ ~~c~~***C***oncrete***, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B1.~~1~~**2**.TP-42	3.5.1-055	A
Supports for ASME Class 2 and 3 Piping and Components (Constant and variable load spring hangers; rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames; bolting)	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-24	3.5.1-091	A
				Loss of Mechanical Function	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-28	3.5.1-057	A
			Treated Water	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1.TP-10	3.5.1-090	A
					Water Chemistry (B.2.1.2)	III.B1.1.TP-10	3.5.1-090	B
		Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-226	3.5.1-081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-229	3.5.1-087	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-108 is revised as shown below:

Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-2191 Item**	**NUREG-2192 Table 1 Item**	**Notes**
Supports for ASME Class 2 and 3 Piping and Components (Constant and variable load spring hangers; rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames; bolting)	Structural Support	Galvanized Bolting	Air - Indoor, Uncontrolled	Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-229	3.5.1-087	A
		Galvanized Steel	Air - Indoor, Uncontrolled	None	None	III.B1.~~1~~**2**.TP-8	3.5.1-095	A
		Stainless Steel	Air - Indoor, Uncontrolled	Cracking	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A
				Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A
			Treated Water	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1.TP-10	3.5.1-090	A
					Water Chemistry (B.2.1.2)	III.B1.1.TP-10	3.5.1-090	B

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-109 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 2 and 3 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-24	3.5.1-091	A
			Treated Water	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1.TP-10	3.5.1-090	A
					Water Chemistry (B.2.1.2)	III.B1.1.TP-10	3.5.1-090	B
		Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-226	3.5.1-081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-229	3.5.1-087	A
		Galvanized Bolting	Air - Indoor, Uncontrolled	Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.TP-229	3.5.1-087	A
		Galvanized Steel	Air - Indoor, Uncontrolled	None	None	III.B1.~~1~~**2**.TP-8	3.5.1-095	A
		Stainless Steel	Air - Indoor, Uncontrolled	Cracking	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A
				Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A
			Treated Water	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1.TP-10	3.5.1-090	A
					Water Chemistry (B.2.1.2)	III.B1.1.TP-10	3.5.1-090	B
		Stainless Steel Bolting	Air - Indoor, Uncontrolled	Cracking	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A
				Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**2**.T-36b	3.5.1-099	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-110 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class 2 and 3 Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	Structural Support	Stainless Steel Bolting	Air - Indoor, Uncontrolled	Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~***2***.TP-229	3.5.1-087	A
Supports for ASME Class MC Components (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	~~Grout~~ ***Concrete, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B1.~~1~~***3***.TP-42	3.5.1-055	A, 1
		~~Reinforced concrete~~	~~Air - Indoor, Uncontrolled~~	~~Reduction in Concrete Anchor Capacity~~	~~Structures Monitoring (B.2.1.33)~~	~~III.B1.1.TP-42~~	~~3.5.1-055~~	~~A~~

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class MC Components (Constant and variable load spring hangers; rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames; bolting, clevis pins, and vent system supports)	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1~~1~~**3**.T-24	3.5.1-091	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-111 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class MC Components (Constant and variable load spring hangers; rod hangers, clamps, straps, guides, stops, seismic anchors or restraints, support frames; bolting, clevis pins, and vent system supports)	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Mechanical Function	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**3**.T-28	3.5.1-057	A
			Treated Water	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.1.TP-10	3.5.1-090	A
					Water Chemistry (B.2.1.2)	III.B1.1.TP-10	3.5.1-090	B
		Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**3**.TP-226	3.5.1-081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~**3**.TP-229	3.5.1-087	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, pages 3.5-112 and 3.5-113 are revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for ASME Class MC Components (Support members; welds; bolted connections; support anchorage to building structure)	Structural Support	Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~***3***.TP-226	3.5.1-081	A
				Loss of Preload	ASME Section XI, Subsection IWF (B.2.1.30)	III.B1.~~1~~***3***.TP-229	3.5.1-087	A
Supports for Emergency Diesel Generator, HVAC System Components, and Other Miscellaneous Mechanical Equipment (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	***Concrete, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B4.TP-42	3.5.1-055	A
			Air - Outdoor	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B4.TP-42	3.5.1-055	A
		Reinforced concrete	Groundwater/Soil	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-212	3.5.1-065	A
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-29	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	III.A3.TP-108	3.5.1-042	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-116 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for Platforms, Pipe Whip Restraints, Jet Impingement Shields, Masonry Walls, and Other Miscellaneous Structures (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	~~Reinforced~~ ~~c~~***C***oncrete***, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B5.TP-42	3.5.1-055	A
			Air - Outdoor	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B5.TP-42	3.5.1-055	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, pages 3.5-118 and 3.5-119 are revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for Raceways, Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	***Concrete, grout***	Air - Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B2.TP-42	3.5.1-055	A
			Air - Outdoor	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B2.TP-42	3.5.1-055	A
		Reinforced concrete	Groundwater/Soil	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-212	3.5.1-065	A
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-29	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	III.A3.TP-108	3.5.1-042	A

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, page 3.5-120 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for Raceways, Cable Trays, Conduit, HVAC Ducts, Tube Track, Instrument Tubing, Non-ASME Piping and Components (Support members; welds; bolted connections; support anchorage to building structure)	Structural Support	Galvanized Steel	Air – Indoor, Uncontrolled	None	None	III.B2.TP-8	3.5.1-095	A
			Air – Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	III.B2.TP-6	3.5.1-093	A
			Water - Flowing	***Loss of Material***	***Structures Monitoring (B.2.1.33)***			***H, 4***

SLRA Table 3.5.2-2, Component Supports Summary of Aging Management Evaluation, pages 3.5-121 and 3.5-122 are revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Supports for Racks, Panels, Cabinets, and Enclosures for Electrical Equipment and Instrumentation (Building concrete at locations of expansion and grouted anchors; grout pads for support base plates, embedments)	Structural Support	***Concrete, grout***	Air – Indoor, Uncontrolled	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B3.TP-42	3.5.1-055	A
			Air – Outdoor	Reduction in Concrete Anchor Capacity	Structures Monitoring (B.2.1.33)	III.B3.TP-42	3.5.1-055	A
		Reinforced concrete	Groundwater/Soil	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-212	3.5.1-065	A
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A3.TP-29	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	III.A3.TP-108	3.5.1-042	A

The plant specific notes for SLRA Table 3.5.2-2, Component Supports, Aging Management Review Results, page 3.5-125 are revised as shown below:

Plant Specific Notes:

1. The columns that support the torus saddles use epoxy grout in the anchor bolt holes under the base plates. The anchor bolts are not preloaded in order to facilitate sliding on the Lubrite plates that are on top of the base plate and below the bottom of the column. The anchor bolts and epoxy grout are not subject to high temperatures or high radiation levels. This epoxy grout in an air – indoor uncontrolled environment is considered to be similar to cementitious grout in an air – indoor uncontrolled environment for this line item and has the same aging effects.
2. The Structures Monitoring (B.2.1.33) is substituted to manage loss of material of the carbon steel non-ASME IWF supports exposed to treated water.
3. ***The ASME Section XI, Subsection IWF (B.2.1.30) AMP is used to manage loss of fracture toughness for the reactor vessel skirt and reactor vessel to reactor shield wall stabilizer. See further evaluation 3.5.2.2.2.6 for evaluation of irradiation effects that might lead to a loss of fracture toughness.***
4. ***The Structures Monitoring AMP (B.2.1.33) is used to manage loss of material for the galvanized steel cable trays in the Units 2 and 3 Crib House since there is significant water in-leakage and, therefore, the service environment is classified as Water – Flowing.***

SLRA Table 3.5.2-3, Cooling Water Structures, Summary of Aging Management Evaluation, pages 3.5-126, 3.5-127, 3.5-128, 3.5-129, and 3.5-130, are revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Bolting (Structural)	Structural Support	Carbon and Low Alloy Steel Bolting	Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
		Galvanized Bolting	Air - Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	III.A6.TP-248	3.5.1-080	A
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A~~3~~***6***.TP-261	3.5.1-088	A
Concrete Elements: Anchors	Structural Support	Galvanized Bolting	Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete Elements: Embedments	Structural Support	Galvanized Steel	Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
			Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete: Above-grade exterior (accessible)	Structural Support	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-26~~ ***III.A6.TP-38***	~~3.5.1-066~~ ***3.5.1-059***	~~A~~ ***B***
				Loss of Material (Spalling, Scaling) and Cracking	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-23~~ ***III.A6.TP-36***	~~3.5.1-064~~ ***3.5.1-060***	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-24~~ ***III.A6.TP-37***	~~3.5.1-063~~ ***3.5.1-061***	~~A~~ ***B***
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Concrete: Above-grade exterior (inaccessible)	Structural Support	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-104	3.5.1-065	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	~~III.A3.TP-108~~ ***III.A6.TP-110***	~~3.5.1-042~~ ***3.5.1-049***	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B.2.1.33)	~~III.A3.TP-67~~ ***III.A6.TP-109***	~~3.5.1-047~~ ***3.5.1-051***	A
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete: All (inaccessible)	Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-220	3.5.1-050	A
			Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-220	3.5.1-050	A
			Groundwater/Soil	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-220	3.5.1-050	A
			Water - Flowing	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-220	3.5.1-050	A
Concrete: Below-grade exterior (accessible)	Direct Flow Structural Support	Reinforced concrete	Water - Flowing	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Concrete: Below-grade exterior (inaccessible)	Direct Flow Structural Support	Reinforced concrete	Groundwater/Soil	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-104	3.5.1-065	A
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-107	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	~~III.A3.TP-108~~ ***III.A6.TP-110***	~~3.5.1-042~~ ***3.5.1-049***	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B.2.1.33)	III.A6.TP-109	3.5.1-051	A, 1

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Earthen water-control structures: Embankments (Canals)	Direct Flow Water retaining boundary	Soil, rip-rap, gravel, rock	Air - Outdoor	Loss of Material; Loss of Form	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-22	3.5.1-058	~~A~~ ***B***
Earthen water-control structures: Embankments (Canals)	Direct Flow Water retaining boundary	Soil, rip-rap, gravel, rock	Water - Flowing	Loss of Material; Loss of Form	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-22	3.5.1-058	~~A~~ ***B***
	Structural Support	Concrete	Air - Outdoor	Loss of Material (Spalling, Scaling) and Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-36	3.5.1-060	~~A~~ ***B***
			Groundwater/Soil	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-107	3.5.1-067	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Metal components (ice melt gate)	Water retaining boundary	Cast Iron	Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
					Selective Leaching (B.2.1.21)	VII.C1.A-51	3.3.1-072	D

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Precast Concrete - Beams and Panel	Structural Support	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-26~~ ***III.A6.TP-38***	~~3.5.1-066~~ ***3.5.1-059***	~~A~~ ***B***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Precast Concrete - Beams and Panel	Structural Support	Reinforced concrete	Air - Outdoor	Loss of Material (Spalling, Scaling) and Cracking	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-23~~ ***III.A6.TP-36***	~~3.5.1-064~~ ***3.5.1-060***	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	~~Structures Monitoring (B.2.1.33)~~ ***Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)***	~~III.A3.TP-24~~ ***III.A6.TP-37***	~~3.5.1-063~~ ***3.5.1-061***	~~A~~***B***, 1
Steel Components: structural steel	Direct Flow Structural Support	Carbon Steel	Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
			Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
Structural Miscellaneous (Bridge Bearing Pads)	Vibration Isolation	Elastomer	Air - Outdoor	Reduction or Loss of Isolation Function	Structures Monitoring (B.2.1.33)	III.B4.TP-44	3.5.1-094	A

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Structures, Non-Category 1 (deicing line)	Direct Flow Water retaining boundary	Galvanized Steel	Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
	Structural Support	Concrete	Groundwater/Soil	Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-107	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-110	3.5.1-049	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~***B***, 1
			Water - Standing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***

SLRA Table 3.5.2-4, Crib Houses, Summary of Aging Management Evaluation, pages 3.5-132, 3.5-133, 3.5-134, and 3.5-135, are revised as shown below.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Bolting (Structural)	Structural Support	Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
		Galvanized Bolting	Air - Indoor, Uncontrolled	Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Bolting (Structural)	Structural Support	Stainless Steel Bolting	Air - Indoor, Uncontrolled	Cracking	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	VII.H2.AP-55	3.3.1-040	E, 1
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete Elements: Anchors	Structural Support	Carbon and Low Alloy Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
		Galvanized Bolting	Air - Indoor, Uncontrolled	Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~A~~ ***B***
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
		Stainless Steel Bolting	Air - Indoor, Uncontrolled	Cracking	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete Elements: Anchors	Structural Support	Stainless Steel Bolting	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
			Raw Water	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	VII.H2.AP-55	3.3.1-040	E, 1
				Loss of Preload	Structures Monitoring (B.2.1.33)	III.A6.TP-261	3.5.1-088	A
Concrete Elements: Curbs	Direct Flow	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
				Loss of Material (Spalling, Scaling) and Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-36	3.5.1-060	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***, 2
Concrete Elements: Embedments	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	~~III.A3.TP-302~~ ***III.A6.TP-248***	~~3.5.1-077~~ ***3.5.1-080***	~~A~~ ***C***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete: Above-grade exterior (accessible)	Flood Barrier Missile Barrier Shelter/Protection Structural Support	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
				Loss of Material (Spalling, Scaling) and Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-36	3.5.1-060	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~***B***, 2
Concrete: Above-grade exterior (inaccessible)	Flood Barrier Missile Barrier Shelter/Protection Structural Support	Reinforced concrete	Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-104	3.5.1-065	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	~~III.A3.TP-108~~ ***III.A6.TP-110***	~~3.5.1-042~~ ***3.5.1-049***	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B.2.1.33)	III.A6.TP-109	3.5.1-051	A, 2
Concrete: All (accessible)	Flood Barrier Missile Barrier Shelter/Protection Structural Support Water Retaining Boundary	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-25	3.5.1-054	A
			Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-25	3.5.1-054	A

SLRA Table 3.5.2-4, Crib Houses, Summary of Aging Management Evaluation, pages 3.5-137, 3.5-138, 3.5-139, 3.5-140, and 3.5-141, are revised as shown below.

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete: Foundation (accessible) ~~(Unit 2 & 3 only)~~	Structural Support Water Retaining Boundary	Reinforced concrete	Water - Flowing	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
				Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Concrete: Foundation (inaccessible) ~~(Unit 2 & 3 only)~~	Structural Support Water Retaining Boundary	Reinforced concrete	Groundwater/Soil	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-104	3.5.1-065	A
				Increase in Porosity and Permeability, Cracking, Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-107	3.5.1-067	A
				Loss of Material (Spalling, Scaling) and Cracking	Structures Monitoring (B.2.1.33)	III.A6.TP-110	3.5.1-049	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B.2.1.33)	III.A6.TP-109	3.5.1-051	A, 2

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Concrete: Interior (accessible)	Flood Barrier Missile Barrier Shelter/Protection Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***
			Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Concrete: Interior (inaccessible)	Flood Barrier Missile Barrier Shelter/Protection Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	III.A6.TP-104	3.5.1-065	A
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Structures Monitoring (B.2.1.33)	III.A6.TP-109	3.5.1-051	A
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Equipment supports and foundations	Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***
				Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.T-20	3.5.1-056	~~A~~ ***B***
Hatches/Plugs ~~(Unit 2 & 3 only)~~	Missile Barrier Shelter/Protection Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	~~III.A3.TP-302~~ ***III.A6.TP-248***	~~3.5.1-077~~ ***3.5.1-080***	~~A~~ ***C***
		Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
Masonry walls: Above-grade exterior ~~(Unit 2 & 3 only)~~	Shelter/Protection Structural Support	Concrete Block	Air - Outdoor	Cracking	Masonry Walls (B.2.1.32)	III.A6.T-12	3.5.1-070	A
				Loss of Material (Spalling, Scaling) and Cracking	Masonry Walls (B.2.1.32)	III.A6.TP-34	3.5.1-071	A
Masonry walls: Interior ~~(Unit 2 & 3 only)~~	Shelter/Protection Structural Support	Concrete Block	Air - Indoor, Uncontrolled	Cracking	Masonry Walls (B.2.1.32)	III.A6.T-12	3.5.1-070	A

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Precast Concrete - Beams and Panel ~~(Unit 2 & 3 only)~~	Missile Barrier Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
			Air - Outdoor	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-38	3.5.1-059	~~A~~ ***B***
				Loss of Material (Spalling, Scaling) and Cracking	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-36	3.5.1-060	~~A~~ ***B***
			Water - Flowing	Increase in Porosity and Permeability, Loss of Strength	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-37	3.5.1-061	~~A~~ ***B***, 2
Steel Components (Trash Rack, Grills, and Gates)	Filter Water Retaining Boundary	Carbon Steel	Air - Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	~~III.A3.TP-302~~ ***III.A6.TP-248***	~~3.5.1-077~~ ***3.5.1-080***	~~A~~ ***C***
			Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
		Galvanized Steel	Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
			Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Steel Components: structural steel ~~(Unit 2 & 3 only)~~	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	~~III.A3.TP-302~~ ***III.A6.TP-248***	~~3.5.1-077~~ ***3.5.1-080***	~~A~~ ***C***
		Galvanized Steel	Air - Outdoor	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
			Water - Flowing	Loss of Material	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-221	3.5.1-083	~~C~~ ***D***
Structural Miscellaneous (Stop Logs)	Water retaining boundary	Treated Wood	Air - Outdoor	Loss of Material; Change in Material Properties	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-223	3.5.1-062	~~A~~ ***B***
			Water - Flowing	Loss of Material; Change in Material Properties	Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34)	III.A6.TP-223	3.5.1-062	~~A~~ ***B***
Structural Miscellaneous - Siding, Closure Plate ~~(Unit 2 & 3 only)~~	Shelter/Protection	Aluminum	Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B5.T-37b	3.5.1-100	C
		Carbon Steel	Air - Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	~~III.A3.TP-302~~ ***III.A6.TP-248***	~~3.5.1-077~~ ***3.5.1-080***	~~A~~ ***C***

SLRA Table 3.5.2-9, Primary Containment, Aging Management Review Results, page 3.5-164 is revised as shown below:

Component Type	**Intended Function**	**Material**	**Environment**	**Aging Effect Requiring Management**	**Aging Management Programs**	**NUREG-2191 Item**	**NUREG-2192 Table 1 Item**	**Notes**
Sliding Surfaces ***(drywell radial beam seats)***	Structural Support	Lubrite	Air - Indoor, Uncontrolled	Loss of Mechanical Function	Structures Monitoring (B.2.1.33)	III.A4.TP-35	3.5.1-076	A
Steel Components: ring girder assemblies ***(under reactor vessel skirt)***~~, stabilizers, and truss arrangements~~	Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	III.A4.TP-302	3.5.1-077	A
Steel Components: stabilizers (truss arrangements between reactor shield wall to drywell)	***Structural Support***	***Carbon Steel***	***Air - Indoor, Uncontrolled***	***Loss of Material***	***ASME Section XI, Subsection IWF (B.2.1.30)***	***III.B1.1.T-24***	***3.5.1-091***	***A, 6***
					Structures Monitoring (B.2.1.33)	***III.A4.TP-302***	***3.5.1-077***	***A***
				Loss of Fracture Toughness	***ASME Section XI, Subsection IWF (B.2.1.30)***			***H, 6, 7***
					Structures Monitoring (B.2.1.33)			***H, 5***

SLRA Table 3.5.2-9, Primary Containment, page 3.5-166 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Steel Elements: Torus – ring girders	*Structural Pressure Barrier* *Structural Support* *Water Retaining Boundary*	*Carbon Steel*	*Air - Indoor, Uncontrolled*	*Loss of Material*	*ASME Section XI, Subsection IWE (B.2.1.29)*	*II.B1.1.CP-109*	*3.5.1-007*	*B*
			Treated Water	*Loss of Material*	*ASME Section XI, Subsection IWE (B.2.1.29)*	*II.B1.1.CP-109*	*3.5.1-007*	*B*

SLRA Table 3.5.2-9, Primary Containment, page 3.5-167 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Steel Elements: liner, liner anchors, integral attachments (reactor pedestal and reactor shield wall)	HELB/MELB Shielding Structural Support	Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	III.A4.TP-302	3.5.1-077	A
				Loss of Fracture Toughness	***Structures Monitoring (B.2.1.33)***			***H, 5***

The plant specific notes for SLRA Table 3.5.2-9, Primary Containment, Aging Management Review Results, page 3.5-168 are revised as shown below:

Plant Specific Notes:

1. The TLAA designation in the Aging Management Programs column indicates fatigue of this component is evaluated in Section 4.6.
2. The TLAA designation in the Aging Management Programs column indicates aging mechanisms for this component are evaluated in Section 4.4 as part of environmental qualification.
3. The normal environment for this component is Air-indoor, Uncontrolled. The refueling bulkhead and associated bellows are exposed to treated water only when the reactor is in a cold shutdown condition with the reactor cavity filled with water to support refueling operations. This environment is short-lived; therefore, it is not addressed separately for aging management.
4. This component is not in low-flow or stagnant areas since the area is drained upon completion of the refueling outage and heat from the reactor pressure vessel causes rapid evaporation of any moisture remaining in the bellows. Plant-specific operating experience reviews have not identified any failures or leakage from the refueling bellows as described in SLRA section 3.5.2.2.1.3, item 1. Any such failures would be detected by monitoring of water level in the spent fuel pool and as well as by reactor cavity and bellows leakage detection instrumentation that alarms in the main control room.
5. ***The Structures Monitoring (B.2.1.33) AMP is used to manage loss of fracture toughness. See further evaluation 3.5.2.2.2.6 for Reactor Shield Wall Structural Steel Irradiation evaluation.***
6. ***The stabilizers (truss arrangements between reactor shield wall to drywell) are inspected per an augmented ASME Section XI, Subsection IWF Program.***
7. ***The ASME Section XI, Subsection IWF (B.2.1.30) AMP is used to manage loss of fracture toughness. See further evaluation 3.5.2.2.2.6 for evaluation of irradiation effects that might lead to a loss of fracture toughness.***

SLRA Table 3.5.2-11, Reactor Building, Summary of Aging Management Evaluation, page 3.5-179 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Hatches/Plugs	Flood Barrier Missile Barrier Shelter/Protection Shielding Structural Pressure Barrier Structural Support	Reinforced concrete	Air - Indoor, Uncontrolled	Cracking, Loss of Bond, and Loss of Material (Spalling, Scaling)	Structures Monitoring (B.2.1.33)	~~III.A4.TP-26~~ ***III.A2.TP-26***	3.5.1-066	A

SLRA Table 3.5.2-13, Structural Commodity Group, Summary of Aging Management Evaluation, page 3.5-190 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Penetration Seals, seals, gaskets, ***structural sealants, seismic joint fillers,*** and moisture barriers (including caulking, flashing and other sealants)	Flood Barrier HELB/MELB Shielding Shelter/Protection Shielding Structural Pressure Barrier Structural Support Water Retaining Boundary	Elastomer	Air - Indoor, Uncontrolled	Loss of Sealing	Structures Monitoring (B.2.1.33)	III.A6.TP-7	3.5.1-072	A
			Air - Outdoor	Loss of Sealing	Structures Monitoring (B.2.1.33)	III.A6.TP-7	3.5.1-072	A
			Groundwater/Soil	Loss of Sealing	Structures Monitoring (B.2.1.33)	III.A6.TP-7	3.5.1-072	A

SLRA Table 3.5.2-13, Structural Commodity Group Summary of Aging Management Evaluation, page 3.5-192 is revised as shown below:

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Programs	NUREG-2191 Item	NUREG-2192 Table 1 Item	Notes
Structural Miscellaneous - catwalks, grating, handrails, kick plates, ladders, platforms, stairs, ***steel curbs, decking, sump covers, vents, permanent scaffolding, roof scuttles, fixed louvers,*** etc*.*	Shelter/Protection Structural Support	Aluminum	Air - Indoor, Uncontrolled	Cracking	Structures Monitoring (B.2.1.33)	III.B2.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B2.T-37b	3.5.1-100	C
			Air - Outdoor	Cracking	Structures Monitoring (B.2.1.33)	III.B2.T-37b	3.5.1-100	C
				Loss of Material	Structures Monitoring (B.2.1.33)	III.B2.T-37b	3.5.1-100	C
		Carbon Steel	Air - Indoor, Uncontrolled	Loss of Material	Structures Monitoring (B.2.1.33)	III.B4.TP-43	3.5.1-092	C
			Air - Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	III.B4.TP-43	3.5.1-092	C
		Galvanized Steel	Air - Indoor, Uncontrolled	None	None	III.B2.TP-8	3.5.1-095	A
			Air - Outdoor	Loss of Material	Structures Monitoring (B.2.1.33)	III.B2.TP-6	3.5.1-093	A

Change # 8 – Revisions to ASME Section XI, Subsection IWB, IWC, and IWD AMP Appendix B

Affected SLRA sections: B.2.1.1

Affected SLRA Page Numbers: B-16, B-17

Description of Changes:

Details regarding program code of record for successive intervals are being updated to reflect 10 CFR 50.55a.

Accordingly, SLRA section B.2.1.1 is revised as shown below.

The fifth paragraph of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD, Program Description in SLRA Section B.2.1.1, pages B-16 and B-17 is revised as shown below:

~~In accordance with 10 CFR 50.55a(g)(4), the ISI program is updated each successive 120-month inspection interval to comply with the requirements of the latest edition of the ASME Code specified 18 months before the start of the inspection interval.~~ ***In accordance with 10 CFR 50.55a(g)(4), the ASME Code, Section XI program code of record interval is updated each successive inspection interval (or two consecutive inspection intervals per 10 CFR 50.55a(y)) to comply with the requirements of the latest edition of the ASME Code specified eighteen months before the start of the inspection interval.*** Any deviation from ASME Code, Section XI requirements must be approved by the NRC through a relief request.

Change # 9 – Revisions to Reactor Head Closure Stud Bolting AMP Appendix B

Affected SLRA sections: B.2.1.3

Affected SLRA Page Numbers: B-28

Description of Changes:

Details regarding program code of record for successive intervals are being updated to reflect 10 CFR 50.55a.

Accordingly, SLRA section B.2.1.3 is revised as shown below.

The second paragraph of Reactor Head Closure Stud Bolting, Program Description in SLRA Section B.2.1.3, page B-28 is revised as shown below:

The Reactor Head Closure Stud Bolting program implements ASME Code, Section XI inspection requirements through the ISI Program plan. ~~The current ISI Program plan for the sixth 10-year inspection interval (January 2023 through January 2033) is based on the 2017 ASME Code, Section XI. The future 120-month inspection intervals will incorporate the requirements specified in the version of the ASME Code referenced in 10 CFR 50.55a 18 months before the start of the inspection interval.~~ ***The ISI program is implemented through procedures, in accordance with the requirements of the ASME Code Section XI, supplemented with the applicable requirements of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(g)(4), the ASME Code, Section XI program code of record interval is updated each successive inspection interval (or two consecutive inspection intervals per 10 CFR 50.55a(y)) to comply with the requirements of the latest edition of the ASME Code specified eighteen months before the start of the inspection interval***.

Change # 10 – Additional Details to Bolting Integrity (B.2.1.10)

Affected SLRA sections: B.2.1.10

Affected SLRA Page Numbers: B-65

Description of Changes:

Enhancement 2 describes the periodic sample inspections of bolting for bolted connections where leakage is difficult to detect, and the alternative inspections that may be used. However, Enhancement 2 does not address alternative inspections for submerged bolting exposed to raw water. Appendix B Section B.2.1.10 is being revised to clarify that alternative inspections are not necessary for submerged bolting to exposed to a raw water environment.

Accordingly, SLRA section B.2.1.10 is revised as shown below.

The fifth paragraph of Bolting Integrity, Program Description in SLRA Section B.2.1.10, page B-65 is revised as shown below:

The program will be enhanced to perform periodic sample inspections of bolting for bolted connections where leakage is difficult to detect. This includes submerged closure bolting on service water and fire protection pumps as well as bolting for the traveling screens in a raw water environment; submerged closure bolting on the Low Pressure Coolant Injection System (ECCS) suction strainers in a treated water environment. This also includes closure bolting on systems within the scope of subsequent license renewal which contain air or gas internal environments and systems that are not normally pressurized. Periodic sample inspections will be performed of 20% of the bolting in each material and environment combination population up to a maximum of 19 inspections per unit. This sample size is appropriate because design, operating, and environmental conditions between the units are similar enough such that the results of inspections at one unit are representative of the conditions at the other unit. Both units are of comparable age and changes to water chemistry practices, to plant equipment, and operating conditions have been implemented in a consistent manner across both units. Water chemistry programs monitor various chemistry parameters and require out-of-spec conditions to be corrected under the corrective action program in a timely manner. Raw water systems for both units draw from the same source (Kankakee River). ***If the minimum sample size is not achieved during a 10-year period, then alternative inspections may be performed. For submerged bolting exposed to raw water, no alternative inspections (e.g., diver or remote video inspections) are necessary since existing maintenance activities provide for inspection of an adequate sample size during each 10-year period through the subsequent period of extended operation.***

<u>Change # 11 – Revision to Buried and Underground Piping and Tanks Program</u>

Affected SLRA Sections: A.2.1.27, B.2.1.27

Affected SLRA Page Numbers: A-29, A-30, A-31, B-146, B-147, B-148, B-149, B-150, B-151, B-154

Description of Changes:

SLRA Sections A.2.1.27 and B.2.1.27 are being revised to make the following changes to the program enhancements:

- Enhancement 2 is being revised to clarify that the polymeric piping referenced in the enhancement is carbon fiber reinforced polymer (CFRP).
- Enhancement 5 is being revised to remove the phrase “or otherwise mitigated”.
- Enhancement 9 is being added to require performance of the 100mV minimum polarization test for monitoring of the cathodic protection system for buried aluminum piping managed by the program.
- Enhancement 10 is being added to require monthly monitoring of the makeup flow rate from the plant service water system to the fire protection system.
- Enhancement 11 is being added to monitor and trend the volume of makeup water supplied to the 2/3 A(B) Condensate Storage Tanks (CST) from the makeup demineralizer system.

SLRA Section A.2.1.27 is being revised to address the alternative aging management strategy for the buried aluminum HPCI piping.

SLRA Section B.2.1.27 is being revised to provide additional information regarding cathodic protection system monitoring for the buried aluminum HPCI piping and to clarify that the buried stainless steel and underground steel piping populations are limited.

In addition, the justification for Exception 1 is being revised to add monitoring and trending of makeup flow to the contaminated condensate storage tanks and to provide clarifying information on the HPCI pipe coating thickness and guided wave examinations. The length of the HPCI piping is also being revised from 170 feet to 175 feet.

Finally, SLRA Section B.2.1.27 is also being revised to provide a new operating experience example related to a buried Condensate System pipe leak that occurred in 2009.

Revisions to the commitment list in SLRA Table A.5 are provided in Enclosure B of this submittal.

Accordingly, SLRA Sections A.2.1.27 and B.2.1.27 are revised as shown below.

SLRA Section A.2.1.27, Buried and Underground Piping and Tanks, pages A-29 through A-31, is revised as shown below:

A.2.1.27 Buried and Underground Piping and Tanks

The Buried and Underground Piping and Tanks aging management program is an existing condition monitoring program that manages the aging effects associated with the external surfaces of buried and underground piping and tanks including loss of material, cracking, hardening and loss of strength. It addresses piping and tanks constructed of any material, including carbon steel, stainless steel, polymers, aluminum, carbon fiber reinforced polymer (CFRP), asbestos cement, and cast iron.

The program also manages aging through preventive and mitigative actions (i.e., coatings, backfill quality, and cathodic protection). The number of inspections is based on the effectiveness of the preventive and mitigative actions. Annual cathodic protection surveys are conducted. For steel components, the acceptance criteria for the effectiveness of the cathodic protection is -850 mV instant off relative to copper/copper sulfate reference electrode.

Inspections are conducted by qualified individuals. Where the coatings, backfill or the condition of exposed piping does not meet acceptance criteria such that the depth or extent of degradation of the base metal could have resulted in a loss of pressure boundary function when the loss of material rate is extrapolated to the end of the subsequent period of extended operation, an increase in the sample size will be conducted.

A combination of indirect examinations (i.e., guided wave), contaminated condensate storage tank level monitoring, monitoring and trending of makeup to the contaminated condensate storage tank, and monitoring of ground wells will be utilized in lieu of direct examinations for the buried aluminum piping within the scope of the program.

The Buried and Underground Piping and Tanks aging management program will be enhanced to:

1. Perform direct visual inspections of one 10-linear foot section of buried stainless steel piping during each 10 year period beginning 10 years prior to the subsequent period of extended operation. Piping inspection location will be selected based on risk (i.e., susceptibility to degradation and consequences of failure). Inspections will utilize a method that has been demonstrated to be capable of detecting cracking, whenever coatings are removed exposing the base material.
2. Perform direct visual inspections of two 10-linear foot sections of buried ~~polymeric~~ ***carbon fiber reinforced polymer (CFRP)*** piping during each 10 year period beginning 10 years prior to the subsequent period of extended operation. Piping inspection locations will be selected based on risk (i.e., susceptibility to degradation and consequences of failure).

3. Perform two direct visual inspections of 10 linear foot segments of buried carbon steel piping within the scope of license renewal during each 10 year period beginning 10 years prior to the subsequent period of extended operation. The number of inspections will be increased to nine 10 linear foot segments of buried carbon steel piping within the scope of license renewal if either of the following criteria are not met for the cathodic protection system protecting the buried steel piping within the scope of license renewal:
   a. System is maintained operational at least 85 percent of the time since 10 years prior to the subsequent period of extended operation (excluding time periods in which the cathodic protection system is off-line for testing)
   b. System has provided effective protection for buried steel piping as verified through acceptable annual system testing results 80% of the time since 10 years prior to the subsequent period of extended operation. Testing results for cathodic protection systems protecting steel piping is acceptable if instant off potential is -850 mV or more negative, relative to a copper/copper sulfate reference electrode.
4. Perform guided wave inspections of the common (Unit 2/3) nonsafety-related aluminum High Pressure Coolant Injection (HPCI) System suction line from the contaminated condensate storage tank to the Diesel Generator & HPCI Building. Guided wave examinations will be performed during each 10 year period beginning 10 years prior to the subsequent period of extended operation from within the Diesel Generator & HPCI Building and from the ‘B’ contaminated condensate storage tank. If examination results indicate active corrosion is occurring, then direct examination of suspect areas will be performed. If direct examination identifies loss of material that could result in a loss of pressure boundary function when extrapolated to the end of the subsequent period of extended operation, then an analysis will be conducted to determine the extent of condition and extent of cause. Additional corrective actions (e.g., repair, replacement, increased inspection sample size, increased inspection frequency) will be initiated in accordance with the corrective action program based on the extent of condition and extent of cause analysis.
5. Perform extent of condition inspections for steel and stainless steel piping as follows: When measured pipe wall thickness, projected to the end of the subsequent period of extended operation, does not meet the minimum pipe wall thickness requirements due to degradation of the external surface, the number of inspections within the affected piping categories will be doubled or increased by five, whichever is smaller. If adverse indications are found in the expanded sample, an analysis will be conducted to determine the extent of condition and extent of cause. The scope of the follow-up inspections will be determined based on the analysis. Timing of any additional inspections will be based on the severity of the identified degradation and the consequences of leakage or loss of function. Any additional inspections will be performed within the same 10 year inspection

interval in which the original degradation was identified, or within four years after the end of the 10 year interval if the degradation was identified in the latter half of the 10 year interval. Expansion of sample size may be limited by the extent of piping subject to the observed degradation mechanism or if the piping system or portion of the system is replaced ~~or otherwise mitigated~~ within the same 10 year inspection interval in which the original degradation was identified or within four years after the end of the 10 year interval, if the degradation was identified in the latter half of the 10 year interval.

6. Perform annual system monitoring of the cathodic protection system to ensure effective protection of buried piping with a grace period of up to two months. However, in each calendar year, system monitoring is conducted at least once.
7. Perform volumetric examination of a minimum of 25 percent of the internal tank surface of buried fuel oil tanks within the scope of license renewal during each 10 year period, beginning 10 years prior to the subsequent period of extended operation if either of the following criteria are not met for the cathodic protection system protecting the individual buried steel tank:
   a. System is maintained operational at least 85 percent of the time since 10 years prior to the subsequent period of extended operation (excluding time periods in which the cathodic protection system is off-line for testing).
   b. System has provided effective protection for the buried steel tank as verified through acceptable annual system testing results 80% of the time since 10 years prior to the subsequent period of extended operation. Testing results for cathodic protection systems protecting the steel tanks is acceptable if instant off potential is -850 mV or more negative, relative to a copper/copper sulfate reference electrode.
8. Perform direct visual inspection of one 10-linear foot section of underground steel pipe located in the condensate piping vault during each 10 year period beginning 10 years prior to the subsequent period of extended operation.
9. ***Utilize the 100 mV minimum polarization cathodic protection acceptance criterion for aluminum piping within the scope of the program.***
10. ***Perform monthly monitoring of the makeup flow rate from the plant service water system to the fire protection system. The results will be trended to establish a baseline and indications of abnormal flows or increasing trends will be investigated in accordance with the corrective action program. If unexplained changes to the makeup rate to the fire protection system are identified, then a flow test will be performed by the end of the next refueling outage.***

11. Perform monitoring of the volume of makeup water supplied to the 2/3 A(B) Condensate Storage Tanks (CST) from the makeup demineralizer system. The results will be trended to establish a baseline and indications of abnormal makeup requirements or increasing makeup trends will be investigated in accordance with the corrective action program. If unexplained changes to the volume of makeup water to the 2/3 A(B) Condensate Storage Tanks (CST) are identified, then the source of water loss will be investigated to determine if water loss is occurring through the buried aluminum HPCI line within the scope of the program.

The program will be enhanced no later than six months prior to the subsequent period of extended operation. Inspections that are required to be performed prior to the subsequent period of extended operation will be completed within the 10 years prior to the subsequent period of extended operation, and no later than the last refueling outage prior to the subsequent period of extended operation.

SLRA Section B.2.1.27, Buried and Underground Piping and Tanks, pages B-146 through B-154, is revised as shown below:

B.2.1.27 Buried and Underground Piping and Tanks

Program Description

The Buried and Underground Piping and Tanks aging management program is an existing condition monitoring program that manages the aging effects associated with the external surfaces of buried and underground piping and tanks including loss of material, cracking, hardening and loss of strength. It addresses piping and tanks composed of carbon steel, stainless steel, polymers, aluminum, carbon fiber reinforced polymer (CFRP), asbestos cement, and cast iron exposed to soil, concrete, and underground environments.

The program manages aging through preventive and mitigative actions (i.e., coatings, backfill quality, and cathodic protection), relies on inspection activities, including visual examination of coated buried and underground piping and tanks, electrochemical verification of the effectiveness of the cathodic protection system, nondestructive evaluation of pipe or tank wall thicknesses, and performance monitoring of fire mains. The number of inspections is based on the effectiveness of the preventive and mitigative actions. Annual cathodic protection surveys are conducted. The cathodic protection survey results are evaluated using the -850mV relative to CSE (copper/copper sulfate reference electrode) instant off criterion specified in NACE SP0169 to determine cathodic protection system effectiveness for steel piping and tanks. ***The cathodic protection survey results for aluminum will be evaluated using the 100 mV polarization criterion. The single in-scope buried aluminum line is electrically isolated. The engineering modifications and work orders do not indicate that the line is connected to the grounding grid. In addition, the plant grounding plan drawing does not show a connection to this pipe from the grounding grid. The line has insulating flanges installed at both ends and also has a separate test station to verify isolation. The effects of mixed potentials on the cathodic protection system are not of concern since the section of pipe is isolated and not grounded. Aluminum is the most anodic material installed in the underground utilities at Dresden and, therefore, the mixed metal configuration could potentially result in "native" potential readings that are less negative than the actual native potential of the material in the CLSM environment such that a 100 mV polarization may not necessarily ensure adequate protection. To address this concern, the native potential, which will be the baseline for determining the 100 mV polarization, will be established for the aluminum material utilizing an isolated test coupon installed in the CLSM adjacent to the HPCI line. The use of an isolated test coupon to establish native potential will ensure that the acceptance criterion for cathodic protection of the HPCI line is not biased by any effects from mixed potentials and that adequate protection of the HPCI line is ensured when the***

100 mV polarization criterion is met. The program is being enhanced to perform the 100 mV testing. The program includes a limiting critical potential of not more negative than -1200mV on cathodic protection pipe-to-soil potential measurements of coated pipes to preclude potential damage to coatings. The program confirms cathodic protection effectiveness during the annual surveys through the use of corrosion probes.

Inspections are conducted by qualified individuals. Where the coatings, backfill, or the condition of exposed piping does not meet acceptance criteria such that the depth or extent of degradation of the base metal could have resulted in a loss of pressure boundary function when the loss of material rate is projected to the end of the subsequent period of extended operation, an increase in the sample size will be conducted. Degraded conditions such as loss of material, damaged coatings, non-conforming backfill, or improper cathodic protection system voltage are evaluated under the corrective action program.

The program will be enhanced to perform direct visual inspections of one 10 linear foot section of buried stainless steel piping and one 10 linear foot section of underground steel piping during each 10-year period. A single inspection is appropriate for these populations since the total length of piping in each population is less than 60 feet.

Aging management of the buried Fire Protection System piping will be accomplished through monitoring the activity of the diesel fire pump to detect system leakage.

This program does not address loss of material due to selective leaching. The Selective Leaching (B.2.1.21) program is used to manage loss of material due to selective leaching of susceptible materials.

NUREG-2191 Consistency

The Buried and Underground Piping and Tanks aging management program will be consistent with the ten elements of aging management program XI.M41, “Buried and Underground Piping and Tanks,” specified in NUREG 2191 with the following exception:

Exceptions to NUREG-2191

1 The NUREG 2191 Chapter XI.M41, Buried and Underground Piping and Tanks aging management program recommends the use of backfill consistent with SP0169-2007 Section 5.2.3 or NACE RP0285-2002, Section 3.6. For materials other than aluminum alloy, NUREG 2191 indicates that the use of controlled low strength materials (CLSM) is acceptable to meet the objectives of NACE SP0169-2007. The common (Unit 2/3) nonsafety-related aluminum High Pressure Coolant Injection (HPCI) System suction line from the contaminated condensate storage tank to the Diesel Generator & HPCI Building is backfilled in CLSM. **Program Elements Affected: Preventive Actions (Element 2), Detection of Aging Effects (Element 4)**

Justification for Exception

The 6061-T6 aluminum HPCI line at DNPS was backfilled with CLSM following replacement completed in 2006. CLSM is an alternate to compacted backfill allowed by the DNPS specifications. While CLSM backfill is not expected to result in aggressive conditions for 6061-T6 aluminum, as discussed below, additional assurance of the long-term reliability of the piping is provided by a ***50 mil thick*** cold applied tape coating system that is installed on the pipe as well as a secondary protective encasement of ***8 mil thick*** polyethylene wrap, which was installed in accordance with AWWA C105. This design provides two protective barriers between the aluminum and any water intrusion through the CLSM. The CLSM will increase the durability of the installed coating by preventing movement and minimizing the potential for separation of the coating from the base metal. Further, this piping is provided with cathodic protection which will mitigate any potential corrosion. Electrical resistance corrosion monitoring is also performed, and a corrosion probe is installed in the CLSM directly adjacent to the HPCI line. Monitoring of this corrosion probe indicates that the local environmental conditions are non-aggressive. Guided wave examination of greater than 30 feet of this line was performed in 2019 from within the Diesel Generator & HPCI Building. This examination did not identify any indication of loss of material occurring in the inspected portion of the line.

6061-T6 aluminum alloy has good corrosion resistance and aluminum is naturally resistant to corrosion due to the formation of an adherent and impermeable aluminum oxide passivation layer. However, this protective layer is reactive when exposed to an alkaline environment due to the amphoteric nature of aluminum oxide. Concrete, when still wet and prior to curing, is highly alkaline due to the presence of free water and lime (calcium hydroxide), which is a primary reactive constituent of cement. As such, unprotected aluminum is not typically recommended for use in applications where the unprotected aluminum is exposed to concrete prior to curing. However, through the curing process, the calcium hydroxide reacts to form calcium silicate hydrate depleting the available calcium hydroxide in cured concrete.

Water that permeates through CLSM will potentially be alkaline due to remaining leachable calcium hydroxide resulting in instability of the aluminum oxide passivation layer of embedded aluminum. While the alkalinity of water that permeates through CLSM can be potentially detrimental to aluminum, the environment is expected to be deoxygenated which mitigates potential corrosion as discussed in Aluminum and Aluminum Alloys, ML063390144. With respect to aluminum, the corrosivity of water that permeates through CLSM is limited by the low solubility of calcium hydroxide. As documented in the ASM Handbook of Corrosion Data, aluminum is resistant to corrosion when exposed to calcium hydroxide solutions in laboratory tests. Aluminum alloys are rapidly etched by calcium hydroxide solutions, but the action subsides as a protective film forms on the surface of the aluminum alloy. Further, as documented in ASM Handbook Volume 13B, Corrosion: Materials, concrete and cements cause superficial etching of aluminum, the majority of which occurs prior to curing. The normal aluminum oxide passivation layer degrades when exposed to wet concrete but a new film forms that prevents further degradation.

There is approximately ~~170~~***175*** linear feet of buried aluminum HPCI piping within the scope of the Buried and Underground Piping and Tanks program. This piping has a nominal wall thickness of 0.375" and is subject to low pressure (static head from the contaminated condensate storage tanks). Should degradation occur, the wall loss would most likely present as pitting such that the primary concern with respect to loss of intended function would be through wall leakage rather than structural integrity. While significant degradation is not expected to occur, guided wave examinations of this piping will be performed from both ends of the line on a 10 year frequency. ***Approximately 30 feet of piping will be inspected from each end.*** The extent of piping that will be guided wave inspected is substantially greater than NUREG 2191 recommends for aluminum piping in any Preventive Action Category (10% of total piping for Preventive Action Category F). The 10 year examination frequency will ensure that wall loss will be detected prior to loss of intended function assuming a conservative potential corrosion rate of 15 mils per year. If examination results indicate active corrosion is occurring (guided wave indications classified as greater than "minor"), then direct examination of suspect areas will be performed. ***Guided wave inspection results are considered "minor" indications if wall loss is less than 30% of nominal wall thickness. The minimum required wall thickness of this line was determined to be 0.206" compared to a nominal wall thickness of 0.375". Wall loss exceeding 45% of nominal wall thickness would be required for remaining wall thickness to be below calculated minimum required wall thickness.*** If direct examination identifies loss of material that could result in a loss of pressure boundary function when extrapolated to the end of the subsequent period of extended operation, then an analysis will be conducted to determine the extent of condition and extent of cause. Additional corrective actions (e.g., repair, replacement, increased inspection sample size, increased inspection frequency) will be initiated in accordance with the corrective action program based on the extent of condition and extent of cause analysis. Further, routine level monitoring in the contaminated condensate storage tanks ensures that system intended functions are maintained and would provide for prompt identification of significant leakage that could threaten system intended functions. In addition, existing monitoring of the groundwater wells in the area of the piping would detect minor leakage from the condensate tanks or piping prior to the leak progressing to a size that could potentially impact intended functions. ***The program will be enhanced to monitor and trend the volume of makeup water supplied to the 2/3 A(B) Condensate Storage Tanks (CST) from the makeup demineralizer system. The results will be trended to establish a baseline and indications of abnormal makeup requirements or increasing makeup trends will be investigated in accordance with the corrective action program. If unexplained changes to the***

volume of makeup water to the 2/3 A(B) Condensate Storage Tanks (CST) are identified, then the source of water loss will be investigated to determine if water loss is occurring through the buried aluminum HPCI line within the scope of the program.

Based on the evaluation of the service environment for the buried aluminum HPCI piping, the preventive actions provided for this piping to minimize any degradation, and the monitoring activities provided by this program, there is reasonable assurance that aging will be managed such that intended functions will be maintained consistent with the current licensing basis through the subsequent period of extended operation.

Enhancements

In the elements identified below, the Buried and Underground Piping and Tanks program will be enhanced to:

1. Perform direct visual inspections of one 10 linear foot section of buried stainless steel piping during each 10 year period beginning 10 years prior to the subsequent period of extended operation. Piping inspection location will be selected based on risk (i.e., susceptibility to degradation and consequences of failure). Inspections will utilize a method that has been demonstrated to be capable of detecting cracking, whenever coatings are removed exposing the base material. **Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Acceptance Criteria (Element 6)**

2. Perform direct visual inspections of two 10 linear foot sections of buried ~~polymeric~~ ***carbon fiber reinforced polymer (CFRP)*** piping during each 10 year period beginning 10 years prior to the subsequent period of extended operation. Piping inspection locations will be selected based on risk (i.e., susceptibility to degradation and consequences of failure). **Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Acceptance Criteria (Element 6)**

3. Perform two direct visual inspections of 10 linear foot segments of buried carbon steel piping within the scope of license renewal during each 10 year period beginning 10 years prior to the subsequent period of extended operation. The number of inspections will be increased to nine 10 linear foot segments of buried carbon steel piping within the scope of license renewal if either of the following criteria are not met for the cathodic protection system protecting the buried steel piping within the scope of license renewal:

    a. System is maintained operational at least 85 percent of the time since 10 years prior to the subsequent period of extended operation (excluding time periods in which the cathodic protection system is off-line for testing).

    b. System has provided effective protection for buried steel piping as verified through acceptable annual system testing results 80% of the time since 10 years prior to the subsequent period of extended operation. Testing results for cathodic protection systems protecting steel piping is acceptable if instant off potential is -850 mV or more negative, relative to a copper/copper sulfate reference electrode.

Program Element Affected: Detection of Aging Effects (Element 4)

4. Perform guided wave inspections of the common (Unit 2/3) nonsafety-related aluminum High Pressure Coolant Injection (HPCI) System suction line from the contaminated condensate storage tank to the Diesel Generator & HPCI Building. Guided wave examinations will be performed during each 10 year period beginning 10 years prior to the subsequent period of extended operation from within the Diesel Generator & HPCI Building and from the ‘B’ contaminated condensate storage tank. If examination results indicate active corrosion is occurring, then direct examination of suspect areas will be performed. If direct examination identifies loss of material that could result in a loss of pressure boundary function when extrapolated to the end of the subsequent period of extended operation, then an analysis will be conducted to determine the extent of condition and extent of cause. Additional corrective actions (e.g., repair, replacement, increased inspection sample size, increased inspection frequency) will be initiated in accordance with the corrective action program based on the extent of condition and extent of cause analysis. **Program Elements Affected: Detection of Aging Effects (Element 4) and Corrective Actions (Element 7)**

5. Perform extent of condition inspections for steel and stainless steel piping as follows: When measured pipe wall thickness, projected to the end of the subsequent period of extended operation, does not meet the minimum pipe wall thickness requirements due to degradation of the external surface, the number of inspections within the affected piping categories will be doubled or increased by five, whichever is smaller. If adverse indications are found in the expanded sample, an analysis will be conducted to determine the extent of condition and extent of cause. The scope of the follow-up inspections will be determined based on the analysis. Timing of any additional inspections will be based on the severity of the identified degradation and the consequences of leakage or loss of function. Any additional inspections will be performed within the same 10-year inspection interval in which the original degradation was identified, or within four years after the end of the 10-year interval if the degradation was identified in the latter half of the 10-year interval. Expansion of sample size may be limited by the extent of piping subject to the observed degradation mechanism or if the piping system or portion of the system is replaced~~ or otherwise mitigated ~~within the same 10-year inspection interval in which the original degradation was identified or within four years after the end of the 10-year interval, if the degradation was identified in the latter half of the 10-year interval. **Program Elements Affected: Monitoring and Trending (Element 5), Acceptance Criteria (Element 6), and Corrective Actions (Element 7)**

6. Perform annual system monitoring of the cathodic protection system to ensure effective protection of buried piping with a grace period of up to two months. However, in each calendar year, system monitoring is conducted at least once. **Program Element Affected: Preventive Actions (Element 2)**

7. Perform volumetric examination of a minimum of 25 percent of the internal tank surface of buried fuel oil tanks within the scope of license renewal during each 10 year period, beginning 10 years prior to the subsequent period of extended operation if either of the following criteria are not met for the cathodic protection system protecting the individual buried steel tank:

    a. System is maintained operational at least 85 percent of the time since 10 years prior to the subsequent period of extended operation (excluding time periods in which the cathodic protection system is off-line for testing).

    b. System has provided effective protection for the buried steel tank as verified through acceptable annual system testing results 80% of the time since 10 years prior to the subsequent period of extended operation. Testing results for cathodic protection systems protecting the steel tanks is acceptable if instant off potential is -850 mV or more negative, relative to a copper/copper sulfate reference electrode.

    Program Element Affected: Detection of Aging Effects (Element 4)

8. Perform direct visual inspection of one 10-linear foot section of underground steel pipe located in the condensate piping vault during each 10-year period beginning 10 years prior to the subsequent period of extended operation. **Program Elements Affected: Detection of Aging Effects (Element 4)**

9. ***Utilize the 100 mV minimum polarization cathodic protection acceptance criterion for aluminum piping within the scope of the program. Program Element Affected: Acceptance Criteria (Element 6)***

10. ***Perform monthly monitoring of the makeup flow rate from the plant service water system to the fire protection system. The results will be trended to establish a baseline and indications of abnormal flows or increasing trends will be investigated in accordance with the corrective action program. If unexplained changes to the makeup rate to the fire protection system are identified, then a flow test will be performed by the end of the next refueling outage. Program Elements Affected: Parameters Monitored or Inspected (Element 3), Detection of Aging Effects (Element 4), Monitoring and Trending (Element 5), Acceptance Criteria (Element 6) and Corrective Actions (Element 7).***

11. ***Perform monitoring of the volume of makeup water supplied to the 2/3 A(B) Condensate Storage Tanks (CST) from the makeup demineralizer system. The results will be trended to establish a baseline and indications of abnormal makeup requirements or increasing makeup trends will be investigated in accordance with the corrective action program. If unexplained changes to the volume of makeup water to the 2/3 A(B) Condensate Storage Tanks (CST) are identified, then the source of water loss will be investigated to determine if water loss is occurring through the***

buried aluminum HPCI line within the scope of the program. Program Elements Affected: Detection of Aging Effects (Element 4).

The program will be enhanced no later than six months prior to the subsequent period of extended operation. Inspections that are required to be performed prior to the subsequent period of extended operation will be completed within the 10 years prior to the subsequent period of extended operation, and no later than the last refueling outage prior to the subsequent period of extended operation.

Operating Experience

The following examples of operating experience provide objective evidence that the Buried and Underground Piping and Tanks program will be effective in ensuring that intended functions are maintained consistent with the current licensing basis for the subsequent period of extended operation:

1. In 2018, an aging management program effectiveness review was performed on the Buried Piping and Tank Inspections aging management program activities. The effectiveness review concluded that the DNPS Buried Piping and Tank Inspections AMP is effectively managing aging effects of SSCs within the scope of license renewal to ensure a loss of intended function does not occur. All buried piping on site has been risk ranked in accordance with NEI 09-14 guidelines. Inspections have been and will continue to be performed in accordance with the risk ranking analysis. Inspections have been completed on all high risk buried piping to establish reasonable assurance of continued structural and leakage integrity.

   The results of the effectiveness review elements were as follows:

   - First license renewal commitments were reviewed and found that all implementation activities have been completed or are being performed at the periodicity prescribed by the license renewal commitment. No changes to the scope or frequency of the program inspections have been made. A sample of issue reports written on SSCs within the scope of the program were reviewed and found that corrective actions were completed satisfactorily.

   - Corrective actions, including cause evaluations and prevention of recurrence, were reviewed for timeliness. The review found that the cause of each failed acceptance criteria was known, the program procedures do not require a formal cause evaluation for every inspection failure, and no scope expansion inspections for extent of condition were completed due to a large portion of piping being replaced with corrosion resistant material. The verification of the technical adequacy of the screening and assessment of the effectiveness of AMP enhancements was completed by the corporate aging management coordinators with a total of 48 aging evaluations assigned across the fleet. No evaluations were assigned for the DNPS Buried Piping and Tank Inspections aging management program. A review of the corrective action database did not reveal any issues of aging related degradation in excess of what would be expected. This review demonstrated that the AMP is effective and did not identify any potential new aging effect or degradation mechanism.

- Operating experience within the corrective action program relative to program activities was reviewed, including a review of industry operating experience, going back to 2009. It determined that no changes or enhancements to the program were required.

- The effectiveness review validated that the first license renewal commitments were properly maintained and there were no changes to the commitments for the aging management program.

This operating experience example provides objective evidence of aging management program effectiveness during the first period of extended operation and provides objective evidence that the continued implementation of the program will effectively manage aging by identifying degradation prior to loss of intended function during the subsequent period of extended operation.

2. In 2021, a fleet self-assessment evaluating the performance of the buried piping program for each station was conducted. The assessment focused on procedural compliance, program implementation, program continuous improvement, program organization, and past program findings / deficiencies. The sites assessed were found to meet the procedural and programmatic requirements established to maintain a successful buried piping program.

   For DNPS specifically, the self-assessment identified one gap regarding the buried pipe database MAPPro™. The current risk map in MAPPro™ did not reflect the actual risk of the piping at the station. As an example, Condensate System piping was listed as higher risk piping, although all of the Condensate System piping on-site had been mitigated. An action was assigned and the MAPPro™ database was updated to reflect the actual risk of piping at the station.

   This operating experience example provides objective evidence that the Dresden critically self-assesses program performance and self-identifies actions that support continuous improvement.

3. Annual testing of the cathodic protection (CP) system was conducted in 2015 which identified several problems with the CP rectifiers not providing proper output current. The issue was documented in the corrective action program and actions were developed to track corrections to applicable rectifiers. In addition, it was identified that an engineering study needed to be performed by a NACE qualified vendor to improve the health of the CP system. This engineering study was performed and identified other recommendations for the CP system including enhanced monitoring capabilities as well as installation of additional anodes.

   A project was initiated to upgrade the Dresden CP system and the project was completed during the Fall 2016 refueling outage. This project consisted of installation of 12 new rectifiers, seven (7) smart stacks, multiple anode beds and other associated upgrades. Dresden CP system performance since completion of the 2016 upgrade has exceeded the CP system performance criteria recommended in NUREG-2191, AMP XI.M41.

This operating experience example provides objective evidence that measures to maintain and enhance the CP system are proactively implemented at Dresden to ensure buried piping is adequately protected such that intended functions are maintained through the subsequent period of extended operation.

4. In May 2015, five (5) sections of steel diesel generator fuel oil piping and three (3) sections of steel diesel generator cooling water piping were excavated at three locations and exposed so that direct visual inspections could be performed. These piping segments were selected for inspection based on risk ranking of buried piping at DNPS considering factors such as cathodic protection, age of piping, coatings, and soil characteristics. Inspectors were qualified in accordance with ASTM D 4537, which is endorsed in NRC Regulatory Guide 1.54 "Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants." All coatings were found to be in good condition, adhered tightly to the pipe and were providing sufficient protection. No flaws in the piping were identified. After the visual inspections were performed, coatings were removed to perform direct ultrasonic (UT) examinations. A continuous scan UT examination was performed on piping segments ranging between six (6) inches and 36 inches for each of the eight (8) piping lines. The lowest measured wall thickness for any of the eight (8) piping segments was 74% of nominal wall thickness due to localized wall loss initiating from the internal surface of the piping exposed to raw water. This reading of 0.239" was well above the minimum required wall thickness of 0.100". Loss of material of the internal surface of this piping is managed by the Open-Cycle Cooling Water System (B.2.1.11) program. After UT testing, a primer was applied to the piping segments followed by a cold applied tapecoat system and an outer rockshield prior to backfill.

   This operating experience example provides objective evidence that DNPS has implemented a comprehensive buried piping inspection program that performs direct visual inspections on higher risk buried piping. This example demonstrates that this program implements inspection techniques that are capable of detecting age-related degradation prior to a loss of the component intended function.

5 In June 2009, elevated tritium values were identified in two storm drains at DNPS. A root cause evaluation was performed to identify the cause of the elevated tritium, evaluate the extent of condition and initiate corrective actions to prevent recurrence. The cause of the degradation to the pipe was attributed to the degraded protective moisture barrier wrap installed on two aluminum lines. The original specification for the wrap on buried aluminum piping was unknown but was identified as a bituminous coating. Based on these leaks and a previously identified leak, all of the buried aluminum piping was either mitigated or replaced. The majority of the in-

scope aluminum piping has been mitigated using a structural carbon fiber reinforced polymer (CFRP) wrap. Approximately 175 feet of in scope piping was replaced in kind using a more advanced coating system consisting of a 50 mil thick elastomeric pipe wrap with polypropylene mesh backing and a secondary 8 mil thick polyethylene encasement. In addition, the cathodic protection system at DNPS has been upgraded to provide additional protection to the metallic piping systems. The in-scope buried stainless steel line was not from original plant construction and was installed with a tape wrap system. The stainless steel is not as susceptible to corrosion than the aluminum and carbon steel lines. In-scope carbon steel pipe was specified with a two-component epoxy coating system. There is not reliable documentation for some of the earlier applied coating systems. The replacement or mitigation of all of the aluminum piping and upgrades to the cathodic protection system provide reliable assurance of the remaining pipes to perform their function.

This operating experience example provides objective evidence that the site adequately identifies and responds to issues that are identified in the corrective action program including the evaluation and implementation of appropriate corrective actions to ensure future reliable system operation .

The operating experience relative to the Buried and Underground Piping and Tanks program did not identify an adverse trend in performance. The inspection methods being implemented by the program have been proven effective in detecting aging effects including cracking, loss of material, hardening and loss of strength. Appropriate guidance for evaluation, repair, or replacement is provided for locations where degradation is found. Periodic assessments of the Buried and Underground Piping and Tanks program are performed to identify the areas that need improvement to maintain effective performance of the program. The program is informed and enhanced, when necessary, through the systematic and ongoing review of both plant-specific and industry operating experience. Therefore, there is confidence that continued implementation of the Buried and Underground Piping and Tanks program will effectively manage the effects of aging and initiate corrective actions prior to loss of intended function during the subsequent period of extended operation.

Conclusion

The enhanced Buried and Underground Piping and Tanks program will provide reasonable assurance that the identified aging effects will be adequately managed so that the intended functions of components within the scope of license renewal are maintained consistent with the current licensing basis during the subsequent period of extended operation.

<u>Change # 12 – Revisions to ASME Section XI, Subsection IWE AMP Appendix A & B</u>

Affected SLRA sections: A.2.1.29, B.2.1.29

Affected SLRA Page Numbers: A-32, A-33, B-159, B-160, B-162, B-163, B-166

Description of Changes:

SLRA Sections A.2.1.29 and B.2.1.29 are being revised to clarify the triggering event that would initiate the supplemental one-time volumetric examinations described in Enhancement 2. Enhancement 2 is also being revised to define a timeline over which the supplemental inspections are required to be performed and to provide additional information to describe how extent of condition will be considered if the triggering event occurs. Additional operating experience is also being provided regarding the results of inspections from the 2024 Dresden Unit 3 refueling outage and Section B.2.1.29 is being clarified to describe that the triggering event associated with Enhancement 2 has not occurred to date at Dresden Units 2 or 3.

In addition, Enhancement 1 of the ASME Section XI, Subsection IWE AMP is being revised to utilize a 20% sample size instead of prescribing a specific population of penetrations to be inspected. Enhancement 1 is also being revised to include both cyclic loading and stress corrosion cracking as mechanisms for the aging effect of cracking for consistency with the predicted aging effects in SLRA Table 3.5.2-9.

Appendix A and Appendix B for ASME Section XI, Subsection IWE program are being revised to state that ultrasonic thickness measurements, of the drywell shell that are currently performed on Unit 3 Drywell shell, will continue during the SPEO.

SLRA Section B.2.1.29 is being revised to clarify that the ASME code edition will be in accordance with 10 CFR 50.55a rather than specifying the current code edition of the ASME Section XI, Inspection Program at the time of the SLRA application.

Additionally, details regarding program code of record for successive intervals were updated to reflect 10 CFR 50.55a.

Revisions to the commitment list in SLRA Table A.5 are provided in Enclosure B of this submittal.

Accordingly, SLRA section A.2.1.29 and B.2.1.29 are revised as shown below.

SLRA Section A.2.1.29, ASME Section XI, Subsection IWE, pages A-32 and A-33, is revised as shown below:

A.2.1.29 ASME Section XI, Subsection IWE

The ASME Section XI, Subsection IWE aging management program is an existing condition monitoring program based on ASME Code and complies with the provisions of 10 CFR 50.55a. The program consists of periodic visual, surface, and volumetric examinations, where applicable, of metallic pressure-retaining components of steel containments for signs of degradation, damage, and irregularities. ***These examinations include ultrasonic thickness measurements of the Unit 3 drywell shell from within the drywell at locations in the spherical, cylindrical, and sand bed region. These inspections will continue during the SPEO.*** The program also includes visual examinations for distress of the underlying metal shell for coated areas. Corrective actions are performed in accordance with ASME Code requirements if unacceptable indications are identified. Acceptability of inaccessible areas of steel containment shell is evaluated when conditions found in accessible areas indicate the presence of, or could result in, flaws or degradation in inaccessible areas.

This program also includes aging management for the potential loss of material due to corrosion in the inaccessible areas of the BWR Mark I steel containment.

The ASME Section XI, Subsection IWE aging management program will be enhanced to:

1. Perform surface or enhanced visual examination (e.g., EVT-1) on accessible portions of ***a representative sample (i.e., 20 percent of population) of high-temperature*** ~~one Main Steam System and one Feedwater System~~ drywell penetration***s*** subject to cyclic loading ***and stress corrosion cracking,*** to detect cracking, once per 10-year interval during the subsequent period of extended operation.

2. Implement a one-time supplemental volumetric examination of the containment metal shell surfaces that are inaccessible from one side, if triggered by plant-specific OE. The trigger for this supplemental examination is plant-specific occurrence or recurrence of metal shell corrosion (base metal material loss exceeding 10 percent of nominal plate thickness over a local area as defined by ASME Section III 1965, Section N-513.3)**,** initiated on the inaccessible side or areas, identified since the date of issuance of the first renewed license. ***For the purposes of this enhancement, a local area is defined as a circular area with a radius defined by ½ of the square root of the product of the drywell shell diameter times the shell thickness at the location in question.*** This supplemental volumetric examination consists of a sample of one-foot square locations that include both randomly-selected and focused areas most likely to experience degradation based on plant-specific OE and/or other relevant

considerations such as environment. The sample size, locations, and any needed scope expansion (based on findings) for this one-time set of volumetric examinations should be determined on a plant-specific basis to demonstrate statistically with 95 percent confidence that 95 percent of the accessible portion of the containment liner is not experiencing corrosion degradation with greater than 10 percent loss of nominal thickness. If required, ~~the corrective action program will be used to determine the timing of~~ the supplemental volumetric examinations ***will be completed within two refueling outages of identification of the triggering metal shell corrosion or sooner, as determined by the corrective action program*** based on the severity of the identified degradation. ***Additionally, the corrective action program will be used to assess the results of the one-time inspection and determine the extent of examinations for the other unit.***

3. Provide guidance for proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting consistent with EPRI NP-5067 and TR-104213. Also, provide guidance for storage, lubricant selection, and bolting and coating material selection consistent with Section 2 of Research Council on Structural Connections (RCSC) publication “Specification for Structural Joints Using High-Strength Bolts”.

The program will be enhanced no later than six months prior to the subsequent period of extended operation. If required, the supplemental one-time examinations will be performed in accordance with the schedule identified in the enhancement.

SLRA Section B.2.1.29, ASME Section XI, Subsection IWE, pages B-159 through B-170, is revised as shown below:

B.2.1.29 ASME Section XI, Subsection IWE

Program Description

The ASME Section XI, Subsection IWE aging management program is an existing condition monitoring program based on ASME Code and complies with the provisions of 10 CFR 50.55a. The program consists of periodic visual, surface, and volumetric examinations, where applicable, of metallic pressure-retaining components of steel containments for signs of degradation, damage, and irregularities. The program also includes visual examinations for distress of the underlying metal shell for coated areas. Corrective actions are performed in accordance with ASME Code requirements if unacceptable indications are identified during examinations. When conditions are found in accessible areas which indicate the presence of, or could result in, flaws or degradation in inaccessible areas, the acceptability of the inaccessible areas are evaluated. The scope of the ASME Section XI, Subsection IWE program is consistent with the scope identified in Subsection IWE-1000 and includes the Class MC pressure-retaining components and their integral attachments including wetted surfaces of submerged areas of the pressure suppression chamber and vent system, containment pressure-retaining bolting, and metal containment surface areas, including welds and base metal.

The program includes condition monitoring by means of NDE ultrasonic testing and visual inspections that provide reasonable assurance that the containment shell is not degrading and meets the acceptance criteria set forth in ASME Section XI. In addition, actions are taken to ensure the sand bed drain lines are clear and have no blockage. ***DNPS currently performs ultrasonic thickness measurements of the Unit 3 drywell shell from within the drywell at locations in the spherical, cylindrical, and sand bed region. These inspections will continue during the SPEO.***

This program also includes aging management for the potential loss of material due to corrosion in the inaccessible areas of the BWR Mark I steel containment. The program will be enhanced to perform surface examinations or enhanced visual examination (e.g., EVT-1) on accessible portions of ***a representative sample (i.e., 20 percent of population) of high-temperature*** ~~one Main Steam System and one Feedwater System~~ drywell penetration***s*** subject to cyclic loading ***and SCC*** but have no CLB fatigue analysis ***(see SLRA Table 3.5.2.2.1.5-1 for total population)***. The program will also be enhanced, to perform a one-time supplemental volumetric examination by sampling randomly-selected as well as focused locations susceptible to loss of thickness due to corrosion of containment shell that is inaccessible from one side, if triggered by plant-specific operating experience ***(base metal material loss exceeding 10 percent of nominal plate thickness over a local area as defined by ASME Section III 1965, Section N-513.3). A local area is defined as a circular area with a***

radius defined by ½ of the square root of the product of the drywell shell diameter times the shell thickness at the location in question. Inspection results are compared with prior recorded results to monitor for degrading conditions and ensure that components remain acceptable for continued service. ***To-date, DNPS has not had any instance of plant-specific operating experience which would have triggered this one-time supplemental volumetric examination.***

The program includes aging management of steel and stainless steel surfaces and components such as the drywell shell and integral attachments, torus shaped pressure suppression chamber, suppression chamber integral attachments, containment penetrations including flued heads and bellows, containment hatches and airlocks, downcomers and bracing, moisture barriers, and pressure-retaining bolting for cracking, loss of leak tightness, loss of material, loss of preload, and loss of sealing in air–indoor uncontrolled and treated water environments.

The ~~current~~ program ***is implemented through procedures, in accordance with the requirements of the*** ~~complies with~~ ASME ***Code*** Section XI, Subsection IWE, ~~2017 Edition,~~ supplemented with the applicable requirements of 10 CFR 50.55a. ***In accordance with 10 CFR 50.55a(g)(4), the ASME Code, Section XI program code of record interval is updated each successive inspection interval (or two consecutive inspection intervals per 10 CFR 50.55a(y)) to comply with the requirements of the latest edition of the ASME Code specified eighteen months before the start of the inspection interval***. ~~In accordance with 10 CFR 50.55a(g)(4), the ISI program is updated each successive 120-month inspection interval to comply with the requirements of the latest edition of the ASME Code specified 18 months before the start of the inspection interval.~~ The ASME Code edition consistent with the provisions of 10 CFR 50.55a will be used during the subsequent period of extended operation.

High strength containment closure bolting susceptible to cracking is not used at DNPS; therefore, surface examination to detect cracking is not applicable. Environments include air-indoor uncontrolled and treated water.

The program utilizes inspections that detect degradation before loss of intended function. The program implements the requirements of IWE by providing visual examinations (General Visual and VT-3) and augmented inspections (VT-1) for evidence of aging effects that could affect structural integrity or leak tightness of the Primary Containment. Areas subject to augmented inspection are subject to visual inspection (VT-1) and volumetric (ultrasonic) examination techniques as required per IWE-1240. The program addresses the E-A, E-C and E-G examination categories described in Table IWE-2500-1 and as approved per 10 CFR 50.55a. The program specifies examinations of accessible surfaces to detect aging effects as addressed in IWE-3500. The frequency and scope of examinations specified is in accordance with 10 CFR 50.55a, and ASME Section XI, Subsection IWE-2400.

The program complies with ASME Section, XI Subsection IWE for inspection of Class MC and metallic shell pressure-retaining components and their integral attachments, in accordance with the provisions of 10 CFR 50.55a. The monitoring methods have been demonstrated effective in detecting the applicable aging effects and the frequency of monitoring is adequate to ensure age-related degradation is identified and appropriate corrective actions are taken prior to loss of intended function.

The program provides for periodic inspections for the presence of age-related degradation on all accessible surfaces of the containment on a scheduled basis. When examination results require an evaluation or the component is repaired and is found to be acceptable for continued service, the areas containing such flaws, degradation, or repair are reexamined during the next inspection period, in accordance with Examination Category E-C.

The acceptance criteria for the ASME Section XI, Subsection IWE program are in accordance with the requirements of the ASME Code, Subsections IWE-3000 and IWE-3500.

Indications are evaluated and compared to acceptance standards. Unacceptable conditions are recorded and documented in accordance with the corrective action program and supplemental examinations are performed in accordance with IWE-3200. Conditions which do not meet the acceptance criteria are accepted by an engineering evaluation or corrected by repair or replacement in accordance with IWE-3122.

Repairs and reexaminations, when required, are performed in accordance with IWA-4000 as required by IWE-3124 and the components are repaired or replaced to the extent necessary to meet the acceptance standards of IWE-3500. Component reexaminations are conducted in accordance with the requirements of IWA-2200 and the results are recorded to demonstrate that the repair meets the owner defined acceptance standards per IWE-3500.

The ASME Section XI Inservice Inspection, Subsection IWE program is implemented in accordance with procedures that are common across Constellation and is considered a fleet program. The program requirements are generally applicable to all Constellation plants, with certain aspects limited to operation beyond 60 years. The equivalent ASME Section XI Inservice Inspection, Subsection IWE program for Peach Bottom Atomic Power Station, including the aspects of the program applicable to operation beyond 60 years, has been previously evaluated by the NRC, as documented in the Safety Evaluation Report Related to the Subsequent License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3 Docket Nos.50-277 and 50-278 (ADAMS Accession Number ML20044D902). Based on this evaluation, the NRC determined that the ASME Section XI Inservice Inspection, Subsection IWE program will adequately manage the effects of aging such that intended function(s) are maintained consistent with the CLB for the subsequent period of extended operation, as required by 10 CFR 50.54(a)(3).

NUREG-2191 Consistency

The ASME Section XI, Subsection IWE aging management program will be consistent with the ten elements of aging management program XI.S1, "ASME Section XI, Subsection IWE," specified in NUREG-2191 with the following exception:

Exceptions to NUREG-2191

1. NUREG-2191 states that steel, stainless steel, and dissimilar metal weld pressure-retaining components that are subject to cyclic loading but have no CLB fatigue analysis, are monitored for cracking and are supplemented with surface examination (or other applicable technique) in addition to visual examination to detect cracking. Dresden has performed a fatigue waiver analysis in accordance with the ASME Code to demonstrate the drywell and associated penetrations do not require a detailed fatigue analysis through the subsequent period of extended operation. This analysis does not include penetrations for high-temperature process lines, those penetrations will require aging management in accordance with the guidance in this AMP. **Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Detection of Aging Effects (Element 4)**

Justification for Exception

The DNPS drywell contains stainless steel penetration sleeves, dissimilar metal welds, and steel components that are subject to cyclic loading but have no current licensing basis fatigue analysis. The DNPS Primary Containment was designed in accordance with ASME Section III, 1965 edition and applicable addenda through the Summer 1965 edition. No fatigue analysis or exemption/waiver was required per this code year or original construction specifications as permitted by later code year editions. The torus attached piping, vents and downcomers are analyzed in TLAA Section 4.6.1 and 4.6.2. Additionally, the drywell to torus vent line bellows and process line penetration bellows are analyzed in TLAA Section 4.6.6 and 4.6.7. DNPS has performed an assessment that has shown that had the drywell shell and portions of drywell penetrations been designed to ASME Section III, 1974 edition, with an expectation to operate for 80 years, it would have met the criteria in subsection NE-3222.4(d) ‘Vessel not requiring analysis for cyclic operation’. The criteria that were met to address this condition included 1) atmospheric to operating pressure cycle, 2) normal operation pressure fluctuation, 3) temperature difference – startup and shutdown, 4) temperature difference – normal operation, 5) temperature difference – dissimilar metals, and 6) mechanical loads. This drywell fatigue waiver assessment concluded that the components that could be subject to cyclic loading but have no current licensing basis fatigue analysis are subjected to an acceptable and negligible amount of fatigue and therefore, no surface or enhanced visual examinations will be performed. This evaluation excluded penetrations for high-temperature process lines.

The program will be enhanced to perform surface examinations or enhanced visual examination (e.g., EVT-1) on accessible portions of ***a representative sample (i.e., 20 percent of population) of high-temperature*** ~~one Main Steam System and one Feedwater System~~ drywell penetration**s** subject to cyclic loading ***and SCC*** but have no CLB fatigue analysis ***(see SLRA Table 3.5.2.2.1.5-1 for total population)***. The majority of the surface of these components are not accessible for visual inspection or surface examination for cracking due to the Mark I containment design. ***Four penetrations*** ~~One penetration for Main Steam System and one for Feedwater System~~ will be selected to represent the ~~remaining~~ population of penetrations for high temperature process lines which include the following:

- ***Main Steam (4 total)***
- ***Feedwater (2 total)***
- Main Steam System Drain ***(1 total)***
- Isolation Condenser Steam Supply ***(1 total)***
- HPCI Steam Supply ***(1 total)***
- LPCI Supply ***(2 total)***
- Cleanup Supply ***(1 total)***
- Recirc. Loop Sample ***(1 total)***
- Isolation Condenser Return ***(1 total)***
- Shutdown Cooling Supply ***(2 total)***

~~The Main Steam System and Feedwater System represent the population due to their larger pipe size (20" and 18" respectively) and thermal cycling during normal operation.~~ A surface exam***ination*** or an enhanced visual examination (e.g., EVT-1) will be performed on the accessible portions of the high-temperature drywell piping penetration subject to cyclic loading.

Original design and installation specifications for containment penetration components such as bellows, welds, and penetration adapters required initial surface examinations to ensure no flaws existed as part of initial installation. Appropriate integrated and local leak rate testing are conducted for pressure boundary components per the 10 CFR 50 Appendix J aging management program. Through-wall cracking would be detected by the type A integrated leak rate test. Additionally, general visual examinations are performed on accessible portions of the containment penetrations in accordance with the IWE program. Dresden has not experienced a failure of the above listed containment components and integrated leak rate test results have shown satisfactory results. Industry operating experience has also shown strong performance of the subject Primary Containment components. License renewal applications for other similar Mark I containments designed to later code years have credited fatigue waivers. Therefore, the existing 10 CFR Part 50 Appendix J leak testing and ASME Section XI, Subsection IWE, are adequate to detect cracking without requiring surface examination or enhanced visual examination for the containment components subjected to low levels of fatigue.

Enhancements

In the elements identified below, the ASME Section XI, Subsection IWE program will be enhanced to:

1. Perform surface or enhanced visual examination (e.g., EVT-1) on accessible portions of ***a representative sample (i.e., 20 percent of population) of high-temperature*** ~~one Main Steam System and one Feedwater System~~ drywell penetration***s*** subject to cyclic loading ***and stress corrosion cracking,*** to detect cracking, once per 10-year interval during the subsequent period of extended operation. **Program Elements Affected: Parameters Monitored or Inspected (Element 3), Detection of Aging Effects (Element 4)**

2. Implement a one-time supplemental volumetric examination of the containment metal shell surfaces that are inaccessible from one side, if triggered by plant-specific OE. The trigger for this supplemental examination is plant-specific occurrence or recurrence of metal shell corrosion (base metal material loss exceeding 10 percent of nominal plate thickness over a local area as defined by ASME Section III 1965, Section N-513.3)**,** initiated on the inaccessible side or areas, identified since the date of issuance of the first renewed license. ***For the purposes of this enhancement, a local area is defined as a circular area with a radius defined by ½ of the square root of the product of the drywell shell diameter times the shell thickness at the location in question.*** This supplemental volumetric examination consists of a sample of one-foot square locations that include both randomly-selected and focused areas most likely to experience degradation based on plant-specific OE and/or other relevant considerations such as environment. The sample size, locations, and any needed scope expansion (based on findings) for this one-time set of volumetric examinations should be determined on a plant-specific basis to demonstrate statistically with 95 percent confidence that 95 percent of the accessible portion of the containment liner is not experiencing corrosion degradation with greater than 10 percent loss of nominal thickness. If required, ~~the corrective action program will be used to determine the timing of~~ the supplemental volumetric examinations ***will be completed within two refueling outages of identification of the triggering metal shell corrosion or sooner, as determined by the corrective action program*** based on the severity of the identified degradation. ***Additionally, the corrective action program will be used to assess the results of the one-time inspection and determine the extent of examinations for the other unit.*** **Program Elements Affected: Detection of Aging Effects (Element 4)**

3. Provide guidance for proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting consistent with EPRI NP-5067 and TR-104213. Also, provide guidance for storage, lubricant selection, and bolting and coating material selection consistent with Section 2 of Research Council on

Structural Connections (RCSC) publication “Specification for Structural Joints Using High-Strength Bolts”. **Program Elements Affected: Preventive Actions (Element 2)**

The program will be enhanced no later than six months prior to the subsequent period of extended operation. If required, the supplemental one-time examinations will be performed in accordance with the schedule identified in the enhancement.

Operating Experience

The following examples of operating experience provide objective evidence that the ASME Section XI, Subsection IWE program will be effective in assuring that intended functions are maintained consistent with the current licensing basis for the subsequent period of extended operation:

1. An AMP effectiveness review was performed in 2018 using Constellation procedural guidance and industry standards. The AMP effectiveness review assessed the key attributes of the existing ASME Section XI, IWE AMP effectiveness including but not limited to detection of aging effects, corrective actions, verification of adherence to license renewal commitments, and evaluation of industry and site-specific operating experience. The review concluded that inspections have been performed in accordance with specified commitment implementation activities (e.g., PM tasks, walkdowns, inspections, etc.). No adverse trends or deficiencies were identified during the inspections or any previous corrective actions. The program was determined to be effectively managing aging in accordance with the existing 10 elements of the AMP.

   This operating experience example provides objective evidence of aging management program effectiveness during the first period of extended operation. This example also demonstrates that periodic program effectiveness reviews are performed to ensure that program effectiveness is maintained and to drive continuous improvement.

2. Generic Letter 87-05 described drywell shell degradation, which occurred in a Mark I containment as a result of water intrusion into the air gap between the outer drywell surface and the surrounding concrete, and subsequent wetting of the drywell shell in the sand pocket area where the water flowed into the open sand pocket at the bottom of the air gap. During refueling activities, a potential leakage path could exist through the drywell bellows region, as experienced on the Mark I containment. The drywell bellows provides a flexible seal between the drywell and the reactor cavity. The drywell to concrete seal drains are also located in this bellows area. Leakage of these components could allow water to enter the 2” expansion gap (annulus region).

   An initial UT was performed during the 18th year of operation (1988) at Dresden Unit 3 in response to the NRC GL 87-05. Based on these results a conservative corrosion rate of 0.01 in/year (10 mpy) was established. DNPS committed to performing ultrasonic testing of the interior surface of the containment shell at the sand bed region of Unit 3 by means of twenty-two (22) core bored holes in the basement of the drywell. Dresden Unit 3 was chosen for the drilling of core bore holes because of the existence of conditions that are considered to be the most potentially corrosive of the two units (Units 2 and 3). The UTs were performed in May 1988, April 1997, February 1999, September 2000, October 2002, November 2004, November 2006, November 2008, November 2010, November 2012, November 2014, November 2016, November 2018, November 2020, and November 2022.

The original corrosion rate from 1988 was further refined in 2010 based on nine (9) consecutive UT inspections of the Dresden Unit 3 core bore hole locations. This analysis concluded that the Unit 3 drywell steel shell thickness corrosion rate is no greater than 0.0072 in/year (7.2 mpy). The corrosion rate estimated in 2010 was conservatively calculated based on the worst-case linear trend from a single core bore hole location using data available as of 2010. Subsequent inspection results demonstrated that the UT thickness measurements have remained relatively constant throughout the entire 34 years of testing from 1988 through 2022. The data collected provided an accurate representation of the condition of the drywell shell at the sand pocket region. Statistical analysis of the UT results was performed in 2023 and concluded that the data obtained over 34 years of inspections represented normal measurement variance and that no drywell shell degradation has occurred at the sand pocket location.

In addition, DNPS conducts a surveillance once per refueling outage on the sand pocket drain lines. The surveillance includes a visual examination on each of the sand pocket drain lines during refueling outages when the refueling cavity is filled with water and the potential for water leakage exists. These surveillances are conducted under the direction of Dresden operating surveillance procedures. This site procedure has been credited for aging management during the first period of extended operation and will continue during the subsequent period of extended operation under the ASME Code, Section XI, Subsection IWE program. Further, prior to every refueling outage the drain lines are verified to be clear of any blockage to ensure a leakage path exists. Minor leakage has been identified during the performance of these inspections. The drains are draining moisture intrusion from the reactor cavity bellows, as designed. Additionally, the leakage only occurs during refueling outages which is an inherently short period of time with respect to the life of the plant.

This operating experience example provides objective evidence that the conditions that exist at the sand pocket area are not actively corroding the containment shell. The current CISI program is being effectively implemented to manage aging effects. Continued implementation of the ASME Section XI, Subsection IWE aging management program will ensure that the potential for corrosion in the sand pocket area of the drywell shell is managed during the subsequent period of extended operation.

3. A monitoring program consisting of UT thickness measurements at various locations of cylindrical and spherical areas of the drywell interior is performed at Dresden Unit 3 periodically. The baseline inspection was performed in November 2008.

   Forty (40) locations have been inspected since 2008 and only one (1) location required additional attention. To better characterize the thickness surrounding the one location, an expanded UT exam on a 1" x 1" grid pattern was performed during the 2022 refueling outage ***and reinspected during the 2024 refueling outage***. This location has been ultrasonically inspected ~~five~~ ***six*** times since 2008. ~~The low spot at this location is approaching 90% nominal plate thickness, however this low spot is very localized and encompasses at most a width of 0.312".~~ ***The low spot has surpassed 90% nominal plate thickness. However, this localized spot does not represent a "local area" as defined in Section 513.3 of the 1965 Edition of ASME Section III code. The results of inspections performed to date have not triggered the one-time supplemental volumetric examinations described in enhancement number 2 to this program.*** The loss is on the outside of the drywell shell and the UT exams are performed from inside the drywell. This location will continue to be inspected by means of a 1 x 1 grid similar to what was performed in 2022 to continue trending this location. There are no concerns for the structural integrity of the containment shell following the review of the 2022 NDE measurement results.

   This operating experience example provides objective evidence that the condition of the containment shell spherical and cylindrical regions are actively monitored and inspected for evidence of corrosion. The current CISI program is being effectively implemented to manage aging effects. Continued implementation of the ASME Section XI, Subsection IWE aging management program will ensure that the potential for corrosion in the spherical and cylindrical regions are actively managed during the subsequent period of extended operation.

4. During performance of Unit 3 refueling outage in 2022, recordable indications were identified on the containment shell through general visual (GV) inspections inside containment. The first condition was identified during the general visual inspection of accessible surface areas on the containment shell in the drywell basement. There are nine (9) recordable indications on the containment shell consisting of missing coating and minor surface oxidation on the containment shell surface. Minor pitting was observed, however no appreciable metal loss was identified. The second condition was identified during the general visual of the accessible surface areas in the torus interior. A 0.25" diameter recordable indication was identified at

Bay 13, the indication was missing coating and surface oxidation was present on the containment shell surface. Minor pitting was identified, however there was also no appreciable metal loss identified at this location.

These recordable indications are isolated to single point locations and do not indicate or introduce any evidence of pressure retaining material loss. General corrosion of surfaces is not expected to cause appreciable loss of material. Evaluation of the inspection results confirmed that there is no evidence of damage or degradation requiring further evaluation or repair/replacement activities. The condition was captured in the CAP database and recommendations were made to ensure that these locations receive proper cleaning and receive proper coating application to restore protective barrier against degradation. The indications on the drywell received coating repair during the 2022 refueling outage. The indication on the torus interior has been scheduled for coating repair during the 2024 refueling outage.

This operating experience example provides objective evidence that the CISI program examinations performed by qualified personnel are capable of detecting damage to in scope components and other indications of possible age-related degradation, and that corrective measures to ensure the integrity of the containment shell are implemented by station. This example also demonstrates that deficiencies are entered into the corrective action program and that actions are taken to address deficiencies in accordance with ASME Code Section XI requirements.

5. During the Dresden Unit 2 refueling outage in 2017, Containment Inservice Inspection (CISI) Program visual examinations, a general visual (GV) examination of Unit 2 Drywell Basement Moisture Barrier was performed. The following refueling outage in 2019, the moisture barrier was inspected again. The results of the GV exam identified recordable indications on multiple locations of the moisture barrier. The recordable indications were reviewed and determined to be relevant since those conditions could allow intrusion of moisture to the inaccessible areas of the drywell shell. Those relevant conditions did not meet the acceptable standards of ASME Section XI, 2013 Edition Subsection IWE-3512.

   Dresden replaced 100% of the moisture barrier in 2019. Upon removal of 100% of moisture barrier, a supplemental visual (VT-1) examination was performed on inaccessible areas of liner behind the moisture barrier. Results of the VT-1 examination identified localized areas of corrosion/pitting on the underlying containment shell. Nominal thickness of drywell shell liner plate at the location where the most severe degradation was identified is 2.25 inches. The maximum local pit depth was measured with a pit gauge as 0.1875 inches, which is less than 10% nominal liner plate thickness (0.225”). The containment liner plate was acceptable as-is without repair or replacement in accordance with IWE-3122.3(a). This condition was addressed and tracked through CAP. An action for engineering to address the extent of degradation in accordance with 10 CFR 50.55a(b)(2)(ix)(A) was performed and the condition was evaluated to be acceptable. The engineering evaluation addressed all of the indications identified on the containment shell plate in 2019 since the corrosion leading to the degraded condition have the same contributors affecting the same component. None of the degraded liner locations identified in 2019 exceeded 10% of the nominal thickness and were, therefore, acceptable as specified in IWE-3122.3(a). The evaluation of the inaccessible area per 10 CFR 50.55a(b)(2)(ix)(A) was included in the ISI Summary Report required by ASME Section XI Article IWA-6000.

During the Unit 2 refueling outage in 2021, engineering with the support of maintenance revisited the same area that had corrosion pitting to compare results from the previous outage. The deepest pit measurement from 2019 and 2021 remained unchanged, and therefore, per IWE-2420(d), this location no longer requires augmented examination in accordance with Table IWE-2500-1 (Examination Category E-C).

Following this pit measurement and VT-1 examination, the metal containment was coated with safety related coatings and a new moisture barrier was applied. Following coating activities, the moisture barrier caulking sealant was inspected to ensure that no degradation (wear, damage, tears, surface cracks, or other defects) existed which would permit intrusion of moisture against inaccessible areas of the pressure retaining surfaces of the metal containment shell/liner. The inspection was completed satisfactorily, and no recordable indications were identified. The new moisture barrier prevents moisture from reaching the inaccessible region of the containment shell.

This operating experience example provides objective evidence that the CISI program examinations can detect degradation in accessible areas which could lead to degradation of inaccessible locations. DNPS fully interrogated the situation by ensuring all moisture barrier was removed to allow for inspection of the underlying inaccessible containment shell. The shell locations which had some existing pitting were inspected twice and determined to have no ongoing degradation. Proper installation of a new moisture barrier ensures that the function to prevent moisture intrusion is met. Additionally, this example highlights the practice of identifying deficiencies and entering them into the corrective action program. This ensures that appropriate actions are taken to evaluate and address deficiencies in accordance with ASME Code Section XI requirements and ensures that follow-up inspections are performed.

6. NRC Information Notice 92-20 was issued to alert licensees to problems with local leak rate testing of two-ply stainless-steel bellows used on piping penetrations at some plants. Specifically, local leak rate testing could not be relied upon to accurately measure the leakage rate that would occur under accident conditions since, during testing, the two plies in the bellows were in contact with each other,

restricting the flow of the local leak rate test medium to the crack locations. Any two-ply bellows of similar construction may be susceptible to this problem.

Based on Dresden operating experience, there is potential for cracking in the bellows assemblies, but not in the dissimilar welds associated with the assemblies.10 CFR Part 50, Appendix J testing has been effective in identifying past bellows assembly degradation due to cracking. The Primary Containment mechanical penetration expansion bellows assemblies originally installed at Dresden were each constructed of two-plies of Type 304 Stainless Steel, formed together into a cylindrical corrugated bellows assembly.10 CFR Part 50, Appendix J Type B LLRT testing was performed on the bellows by pressurizing the volume between the plies. In 1990, it was determined that it was not always possible to quantify the bellows assembly leakage rate due to the design and construction of the bellows assemblies. Dresden reported this to the NRC and the issue was communicated by the NRC to the industry in IN 92-20.

An exemption for certain Type B LLRT testing requirements for Dresden was requested from the NRC in 1991 and was granted in February 1992. A Revision to the exemption was requested in October 1994, and was granted in February 1995. The exemptions apply to the original two-ply bellows assemblies. As they are replaced, the new bellows fall under the full Type B LLRT testing requirements. Replacement bellows are single ply. This ply becomes the Primary Containment pressure boundary.

Transition rings are added to the bellows assemblies to allow for the installation of an outer bellows over the original bellows. The installation of this outer bellows allows for the performance of a Type B LLRT test. Replacement bellows are cold-formed during fabrication, as were the original bellows. To minimize the potential for contamination, installation instructions for the replacement bellows include cleaning the entire outer surface of the inner bellows after welding of the transition rings, and cleaning of the entire inner and outer surfaces of the outer bellows before it is welded.

Degraded bellows assemblies identified since 1991 were identified utilizing the methodology developed to comply with the exemptions. Briefly, this testing methodology is:

- All two-ply bellows assemblies are pressurized between the plies. Any bellows assembly with leakage measuring 0.5 SCFH are further tested with helium.
- The bellows assembly is pressurized between the plies with helium, and the inner and outer plies are interrogated with a helium detector.
- If helium is detected through both plies, the outer ply is examined with penetrant and/or snoop testing. All flaws are measured and mapped.
- All indications are evaluated by engineering to assess current and projected leakage rates, and for structural integrity.

- The 1992 exemption required a Type A ILRT upon completion of all two-ply testing. The 1995 Revision provides the option of performing a test in accordance with Type B LLRT requirements on all bellows assemblies with leaks through both plies, or performing a Type A ILRT.

The 1992 exemption required that all two-ply bellows assemblies with demonstrated leakage through both plies be replaced during the subsequent refueling outage. There is reasonable assurance that the leaking bellows assemblies will not degrade excessively during this period because TGSCC (transgranular stress corrosion cracking) is characterized by the slow development and propagation of cracks. The 1995 Revision provides the option of performing a test in accordance with Type B LLRT requirements to demonstrate license limits are met or replacing the bellows assemblies. The bellows assembly welds at Dresden are inspected utilizing Examination Category E-A, Containment Surfaces, of ASME Boiler and Pressure Vessel Code, Subsection IWE.

This operating experience example provides objective evidence that industry operating experience is being reviewed and evaluated to confirm that station testing procedures are effective to maintain containment integrity.

7. NRC Information Notice 2006-01 was issued to alert licensees that a through-wall crack was discovered in a torus shell at a U.S. BWR. The issue was reviewed for applicability to DNPS, and the results documented in the corrective action program. At the BWR where the cracking was found, the High Pressure Coolant Injection (HPCI) System turbine exhaust line that discharges into the suppression pool is open ended and does not have an end cap or sparger to diffuse energy. Dresden Unit 2 and 3 have a similar design in that they do not have a diffuser (i.e., sparger) on the end of the HPCI exhaust line and, therefore, may be susceptible to similar cracking.

   Dresden Station has modified the torus (column) supports to accommodate the Mark I loads. The HPCI exhaust line to the torus shell configuration (i.e., reinforced nozzle and internal support) at Dresden Station is such that it will transmit the HPCI discharge loads more evenly to the torus shell and column supports. Additionally, when this issue was first identified in June 2005, a visual inspection of the torus support columns was performed on both Units 2 and 3, and no evidence of degradation was noted. Internal and external inspections of the Unit 3 torus for cracking was performed during the refueling outage in 2007. The results of the inspections did not reveal any indications, therefore the inspection for Unit 2 was deemed unnecessary per engineering evaluation.

   Engineering has reviewed the Dresden configuration including the HPCI exhaust line configuration, torus support, HPCI nozzle penetration details, and concluded that the root cause of the torus leak described in Information Notice 2006-01 does not apply for Dresden Station.

This operating experience example provides objective evidence that industry operating experience is reviewed, evaluated, and actions are taken to ensure that events that have occurred at other plants will not occur at DNPS.

The operating experience relative to the program did not identify an adverse trend in performance. The inspection methods being implemented by the program have been proven effective in detecting aging effects including cracking, loss of leak tightness, loss of material, loss of preload, and loss of sealing. Appropriate guidance for evaluation, repair, or replacement is provided for locations where degradation is found. Periodic assessments of the ASME Section XI, Subsection IWE program are performed to identify the areas that need improvement to maintain effective performance of the program. The program is informed and enhanced, when necessary, through the systematic and ongoing review of both plant-specific and industry operating experience. Therefore, there is confidence that continued implementation of the ASME Section XI, Subsection IWE program will effectively manage the effects of aging and initiate corrective actions prior to loss of intended function during the subsequent period of extended operation.

Conclusion

The enhanced ASME Section XI, Subsection IWE program will provide reasonable assurance that the identified aging effects will be adequately managed so that the intended functions of components within the scope of license renewal are maintained consistent with the current licensing basis during the subsequent period of extended operation.

Change # 13 – Revisions to ASME Section XI, Subsection IWF AMP Appendix A & B

Affected SLRA sections: A.2.1.30, B.2.1.30

Affected SLRA Page Numbers: A-33, A-34, B-171, B-173

Description of Changes:

The ASME Section XI, Subsection IWF program description in SLRA Sections A.2.1.30 and B.2.1.30 is being revised to clarify that the edition of the ASME code will be in accordance with 10 CFR 50.55a rather than specifying the current code edition of the ASME Section XI, Inservice Inspection Program at the time of the SLRA application.

In addition, SLRA Section B.2.1.30 is being revised to note that there are no supports within the scope of ASME Section XI, Subsection IWF that have elastomeric vibration elements and that high-strength bolting are only used for the reactor vessel skirt to ring girder connection and including the total number of high strength bolts.

Finally, Enhancement 3 of the ASME Section XI, Subsection IWF aging management program is being revised in SLRA Sections A.2.1.30 and B.2.1.30 to specify that the restriction on the installation of new high strength bolting applies prior to entry into subsequent period of extended operation.

The aging effect “loss of fracture toughness” is being added as an applicable aging effect to Appendix A Section A.2.1.30 and Appendix B Section B.2.1.30.

Additionally, details regarding program code of record for successive intervals are updated to reflect 10 CFR 50.55a.

Revisions to the commitment list in SLRA Table A.5 are provided in Enclosure B of this submittal.

Accordingly, SLRA section A.2.1.30 and B.2.1.30 are revised as shown below.

The first paragraph of SLRA Section A.2.1.30, ASME Section XI, Subsection IWF, page A-33, is revised as shown below:

A.2.1.30 ASME Section XI, Subsection IWF

The ASME Section XI, Subsection IWF aging management program is an existing condition monitoring program that consists of visual examinations of ASME Class 1, 2, 3, and MC piping and component supports and structural bolting for signs of degradation (i.e., loss of material, loss of mechanical function, cracking, pitting crevice corrosion, overload, wear, dirt and debris accumulation, and loss of preload in air-indoor uncontrolled or treated water environment), evaluations, and corrective actions. ***The program also manages loss of fracture toughness of reactor vessel support components.*** The program is implemented through procedures, in accordance with the requirements of the ASME Code, Section XI, Subsection IWF, ~~2017 Edition,~~ as approved in 10 CFR 50.55a. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant degradation.

SLRA Section A.2.1.30, ASME Section XI, Subsection IWF, page A-34, Enhancement #3, is revised as shown below:

3. Revise procedures to require volumetric examination of high-strength bolting (actual measured yield strength greater than or equal to 150 ksi) in sizes greater than 1-inch nominal diameter (including ASTM A490 and equivalent ASTM F2280), if additional high-strength bolting is installed~~ during the subsequent period of extended operation~~. The examination shall be comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 and performed at least once per 10-year interval to detect cracking, in addition to the VT-3 examination required by ASME Section XI.

SLRA Section B.2.1.30, ASME Section XI, Subsection IWF, page B-171 is revised as shown below:

B.2.1.30 ASME Section XI, Subsection IWF

Program Description

The ASME Section XI, Subsection IWF aging management program is an existing condition monitoring program that consists of visual examination of ASME Section XI Class 1, 2, 3, and MC piping and component support members for loss of material, ***loss of fracture toughness,*** loss of mechanical function, cracking, pitting crevice corrosion, overload, wear, dirt and debris accumulation, and loss of preload in air-indoor uncontrolled or treated water environment. Bolting for supports is also included with these components and inspected for loss of material and loss of preload by inspecting for missing, detached, or loosened bolts and nuts. The program utilizes procedures that are consistent with industry guidance to ensure proper specification of bolting material, lubricant, and installation torque to prevent or minimize loss of bolting preload or other loss of structural integrity. Indications of degradation are entered in the corrective action program for evaluation or correction to ensure the intended function of the piping and component support is maintained.

The ~~current~~ program ***is implemented through procedures, in accordance with the requirements of*** ~~complies with~~ ASME ***Code*** Section XI, Subsection IWF, ~~2017 Edition~~ as approved in 10 CFR 50.55a. ***In accordance with 10 CFR 50.55a(g)(4), the ASME Code, Section XI program code of record interval is updated each successive inspection interval (or two consecutive inspection intervals per 10 CFR 50.55a(y)) to comply with the requirements of the latest edition of the ASME Code specified eighteen months before the start of the inspection interval***~~. In accordance with 10 CFR 50.55a(g)(4), the ISI program is updated each successive 120-month inspection interval to comply with the requirements of the latest edition of the ASME Code specified eighteen months before the start of the inspection interval.~~ The ASME Code edition consistent with the provisions of 10 CFR 50.55a will be used during the subsequent period of extended operation. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent significant degradation.

The ASME Section XI, Subsection IWF program utilizes inspections that detect degradation before loss of intended function. Preventive measures associated with structural bolts are addressed in implementing procedures.

All bolting is monitored for cracking, regardless of the mechanism. ***The only identified high strength bolting in sizes greater than 1-inch nominal diameter used on IWF supports at DNPS are the*** reactor vessel support skirt to ring girder bolting**.** ~~consists of high strength bolting in sizes greater than 1-inch nominal diameter.~~ ***There are 60 total high strength bolts at this location.***

Supports within the scope of ASME Section XI, Subsection IWF do not have elastomeric vibration elements at DNPS.

SLRA Section B.2.1.30, ASME Section XI, Subsection IWF, page B-173, Enhancement #3, is revised as shown below:

3. Revise procedures to require volumetric examination of high-strength bolting (actual measured yield strength greater than or equal to 150 ksi) in sizes greater than 1-inch nominal diameter (including ASTM A490 and equivalent ASTM F2280), if additional high-strength bolting is installed ~~during the subsequent period of extended operation~~. The examination shall be comparable to that of ASME Code Section XI, Table IWB-2500-1, Examination Category B-G-1 and performed at least once per 10-year interval to detect cracking, in addition to the VT-3 examination required by ASME Section XI.
Program Elements Affected: Detection of Aging Effects (Element 4)

<u>Change # 14 – Revisions to Structures Monitoring Program</u>

Affected SLRA sections: A.2.1.33, B.2.1.33

Affected SLRA Page Numbers: A-36, A-37, A-38, B-186, B-187, B-188, B-189, B-190

Description of Changes:

SLRA Section A.2.1.33 is being revised to:

- Specify the revision year for various industry standards in the program description.
- Clarify that the program manages loss of fracture toughness of reactor vessel support components in the program description.
- Reword enhancement 3 for clarity.
- Revise enhancement 5 to more closely align with the recommendations in NUREG-2191.
- Revise enhancement 6 to include discoloration as a visual indication of increased porosity and permeability and to add the applicable aging mechanisms.
- Specify the revision year of ACI 349.3R in enhancement 9.
- Revise enhancement 10 to clarify that groundwater infiltration and through concrete leakage will be monitored and trended.
- Specify the revision year of ACI 349.3R in enhancement 11.
- Reword enhancement 13 for clarity.
- Specify the revision year of ACI 349.3R in enhancement 14.
- Revise enhancement 15 to more closely align with the recommendations in NUREG-2191.
- Add enhancement 16 to provide additional guidance on visual indications for detection of expansion due to alkali-aggregate reactivity in concrete.
- Add enhancement 17 to increase the inspection frequency for locations where water in-leakage is resulting in degradation of structural steel components in the Unit 2 torus basement.

SLRA Section B.2.1.33 is being revised to:

- Specify the revision year for various industry standards in the program description.
- Revise the program description for clarity to state that the Masonry Walls (B.2.1.32) program and Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program are implemented as part of the Structures Monitoring aging management program.
- Add loss of fracture toughness as an applicable aging effect for steel components in the program description.
- Clarify in the program description that ASTM F1852 and ASTM F2280 were not used.
- Reword enhancement 3 for clarity.
- Revise enhancement 5 to more closely align with the recommendations in NUREG-2191.

- Revise enhancement 6 to include discoloration as a visual indication of increased porosity and permeability and to add the applicable aging mechanisms.
- Specify the revision year of ACI 349.3R in enhancement 9.
- Revise enhancement 10 to clarify that groundwater infiltration and through concrete leakage will be monitored and trended.
- Specify the revision year of ACI 349.3R in enhancement 11.
- Reword enhancement 13 for clarity.
- Specify the revision year of ACI 349.3R in enhancement 14.
- Revise enhancement 15 to more closely align with the recommendations in NUREG-2191.
- Add enhancement 16 to provide additional guidance on visual indications for detection of expansion due to alkali-aggregate reactivity in concrete.
- Add enhancement 17 to increase the inspection frequency for locations where water in-leakage is resulting in degradation of structural steel components in the Unit 2 torus basement.

Revisions to the commitment list in SLRA Table A.5 are provided in Enclosure B of this submittal.

Accordingly, SLRA Sections A.2.1.33 and B.2.1.33 are revised as shown below.

SLRA Section A.2.1.33, Structures Monitoring, pages A-36 through A-38, is revised as shown below:

A.2.1.33 Structures Monitoring

The Structures Monitoring aging management program is an existing condition monitoring program that consists of periodic visual inspection and monitoring of the condition of concrete and steel structures, structural components, component supports, and structural commodities to ensure that aging degradation (such as those described in ACI 349.3R***-02***, ACI 201.1R***-92***, SEI/ASCE 11***-99***, and other documents) will be detected, the extent of degradation determined and evaluated, and corrective actions taken prior to loss of intended functions. ***The program also manages loss of fracture toughness of reactor vessel support components.*** Structures are monitored on an interval not to exceed 5 years. Inspections also include steel edge supports and steel bracings associated with masonry walls, and periodic evaluation of groundwater chemistry and opportunistic inspections for the condition of below grade concrete. Quantitative results (measurements) and qualitative information from periodic inspections are trended with sufficient detail, such as photographs and surveys for the type, severity, extent, and progression of degradation, to ensure that corrective actions can be taken prior to a loss of intended function. The acceptance criteria are derived from applicable consensus codes and standards.

The Structures Monitoring aging management program will be enhanced to:

1. Add the following structures to the scope of the program.
   a. Bridge over the Units 2 and 3 intake canal
   b. Radwaste Solidification Building
   c. Reactor Building Interlock (Unit 3)
   d. Turbine Building (Unit 1)
2. Clarify that the 138 kV Control Building and the 345 kV Control Building are within the scope of the program.
3. Shorten frequency for inspecting non-segregated bus ducts supports and the ***ring girder for the*** Reactor Vessel support skirt ~~ring girder~~ to an interval not to exceed five years.
4. Explicitly include the following components and commodities within the scope of the program:
   a. Manholes
   b. Sliding Surfaces
   c. Trash Racks

5. Implement preventive actions ***to emphasize proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting. For ASTM A325 or ASTM A490 bolts, the preventive actions*** for storage, lubricant selection, and bolting and coating material selection ~~discussed in~~ ***will be in accordance with*** Section 2 of Research Council for Structural Connection publication “Specification for Structural Joints Using High-Strength Bolts” ~~for structural bolting fabricated from ASTM A325 and ASTM A490~~.

6. Clarify procedures to state that evidence of cracking, spalling, scaling, ***discoloration,*** and leaching could indicate the presence of increased porosity and permeability ***due to mechanisms of aggressive chemical attack or leaching of calcium hydroxide and carbonation***.

7. Expand the program to monitor accessible sliding surfaces for indications of significant loss of material due to wear or corrosion, and for accumulation of debris or dirt. Establish acceptance criteria for sliding surfaces as no significant loss of material due to wear or corrosion, and no debris or dirt that could restrict or prevent sliding of the surfaces, as required by design.

8. Expand the program to monitor elastomeric structural sealants, seismic joint fillers, vibration isolators, and bearing pads for cracking, loss of material, and hardening. Supplement visual inspection of elastomeric elements with tactile inspection to detect hardening if the intended function is suspect. Establish acceptance criteria for elastomeric structural sealants, seismic joint fillers, bearing pads, and vibration isolation elements as no loss of material, cracking, or hardening that can lead to loss of intended function.

9. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to raw water and groundwater/soil environments that will include the following:

    a. Monitor raw water and groundwater chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year). Increase sampling locations to ensure that the results are representative of the groundwater in contact with structures within the scope of subsequent license renewal. Enter adverse results, which exceed water chemistry criteria, into the corrective action program.

    b. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for degradation due to the aggressive water chemistry, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to the potentially aggressive environment.

    c. Develop the initial engineering evaluations prior to the subsequent period of extended operation. Develop follow-up engineering evaluations on an interval not to exceed five years.

d. If warranted based on the engineering evaluations, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to potentially aggressive groundwater/soil.

e. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R***-02*** tier 2 criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventive actions, additional evaluations, and future inspections.

10. Monitor and trend ***indications of groundwater infiltration or*** through~~-wall~~ ***concrete*** ~~groundwater~~ leakage ~~infiltration volumes~~. If leakage volumes allow, procedures will be revised to clarify that water chemistry analysis should be considered for parameters including pH, as well as mineral, chloride, sulfate and iron content in the water to assess for potential impact on age-related degradation of concrete or steel reinforcement. This assessment may include engineering evaluation, more frequent inspections, or destructive testing of affected concrete to validate existing concrete properties, including concrete pH levels.

11. Require that personnel performing inspections and evaluations meet the qualifications specified within ACI 349.3R***-02*** with respect to knowledge of inservice inspection of concrete and visual acuity requirements.

12. Evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas.

13. ~~Perform inspections to establish quantitative baseline inspection data prior to the subsequent period of extended operation for structures in which prior inspection results are inadequate to establish a quantitative baseline to allow for effective monitoring and trending.~~

13. Quantitative baseline inspection data will be established against acceptance criteria provided in the enhanced Structures Monitoring program prior to the subsequent period of extended operation. Previously performed inspections that were conducted using comparable acceptance criteria are acceptable in lieu of performing a new baseline inspection.

14. Provide evaluation criteria for structural concrete using quantitative second tier criteria of Chapter 5 in ACI 349.3R***-02***.

15. Clarify that loose bolts and nuts ~~and cracked bolts~~ are not acceptable unless accepted by engineering evaluation~~s~~.

16. Provide additional guidance on visual indications such as exudations, surface staining, expansion causing structural deformation, relative movement or displacement, misalignment or distortion of attached components for detection of expansion due to alkali-aggregate reactivity in concrete.

17. Locations of degraded steel structural components due to water in-leakage in the Unit 2 torus basement will be inspected on a two-year frequency.

SLRA Section B.2.1.33, Structures Monitoring, Program Description, pages B-186 and B-187, is revised as shown below:

B.2.1.33 Structures Monitoring

Program Description

The Structures Monitoring aging management program is an existing condition monitoring program that consists of periodic visual inspection and monitoring the condition of concrete and steel structures, structural components, component supports, and structural commodities to ensure that aging degradation (such as those described in ACI 349.3R***-02***, ACI 201.1R**-92**, SEI/ASCE 11***-99***, and other documents) will be detected, the extent of degradation determined and evaluated, and corrective actions taken prior to loss of intended functions. Quantitative results (measurements) and qualitative information from periodic inspections are trended with sufficient detail, such as photographs and surveys for the type, severity, extent, and progression of degradation, to ensure that corrective actions can be taken prior to a loss of intended function. The acceptance criteria are derived from applicable consensus codes and standards. For concrete structures, the program will include personnel qualifications and quantitative evaluation criteria of ACI 349.3R***-02***. Inspection frequency for the in scope structures will not exceed five years, with provisions for more frequent inspections when conditions are observed that have a potential for impacting an intended function. Unacceptable conditions, when found, are evaluated or corrected in accordance with the corrective action program. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to detect significant age-related degradation prior to loss of intended function.

The Structures Monitoring aging management program was developed to implement the requirements of 10 CFR 50.65 and is based on NUMARC 93-01, “Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” and Regulatory Guide 1.160, “Monitoring the Effectiveness of Maintenance at Nuclear Power Plants.” The ~~program includes elements of the~~ Masonry Walls (B.2.1.32) program and Inspection of Water-Control Structures Associated with Nuclear Power Plants (B.2.1.34) program ***are implemented as part of the Structures Monitoring aging management program***.

Concrete structures are inspected for indications of deterioration and distress including evidence of leaching, loss of material, cracking, and a loss of bond, as defined in ACI 201.1R***-92***. Steel components are inspected for loss of material due to corrosion ***and loss of fracture toughness***.

Inspections also include steel edge supports and steel bracings associated with masonry walls. Inspections will also be performed for seismic joint fillers and elastomeric materials used in structural applications.

The program also includes provisions for periodic testing and assessment of groundwater chemistry and opportunistic inspections of accessible below grade concrete structures.

Protective coatings are not relied upon to manage the effects of aging for structures included in the scope of this program. A de-watering system is not relied upon to control settlement and porous concrete was not used in the design of foundations.

Applicable components within the scope of this program include, but are not limited to: bolting, concrete anchors and embedments, concrete components, precast concrete, expansion joints, siding, doors, duct banks, foundations, plugs, hatches, missile barriers, metal components such as vents and louvers, miscellaneous steel, penetrations seals and sleeves, pipe whip restraints and jet impingement shields, steel components, steel liners, supports, racks, panels, cabinets, enclosures, cable trays, sliding surfaces, roofing, conduit, and tube track. ***Structural bolting consisting of ASTM F1852 and ASTM F2280 were not used within the scope of this program.***

Applicable metallic materials within the scope of this program include aluminum, carbon steel, galvanized steel, and stainless steel Applicable bolting materials include within the scope of this program include carbon steel, galvanized steel, and stainless steel. Applicable non-metallic materials within the scope of this program include concrete, elastomers, and grout.

Applicable service environments for components within the scope of this program include air-outdoor, air-indoor uncontrolled, treated water, raw water, water-flowing, and groundwater and soil.

Applicable aging effects managed by this program include cracking, distortion, increase in porosity and permeability, loss of bond, loss of material, loss of mechanical function, loss of mechanical properties, loss of preload, loss of sealing, loss of strength, reduction in concrete anchor capacity, and reduction or loss of isolation function.

The Enhancement list for SLRA Section B.2.1.33, Structures Monitoring, pages B-187 through B-190, is revised as shown below:

The Structures Monitoring aging management program will be enhanced to:

1. Add the following structures to the scope of the program.
   a. Bridge over the Units 2 and 3 intake canal
   b. Radwaste Solidification Building
   c. Reactor Building Interlock (Unit 3)
   d. Turbine Building (Unit 1)

   Program Element Affected: Scope of Program (Element 1)

2. Clarify that the 138 kV Control Building and the 345 kV Control Building are within the scope of the program. **Program Element Affected: Scope of Program (Element 1)**

3. Shorten frequency for inspecting non-segregated bus ducts supports and the ***ring girder for the*** Reactor Vessel support skirt ~~ring girder~~ to an interval not to exceed five years. **Program Element Affected: Scope of Program (Element 1) and Detection of Aging Effects (Element 4)**

4. Explicitly include the following components and commodities within the scope of the program:
   a. Manholes
   b. Sliding Surfaces
   c. Trash Racks

   Program Element Affected: Scope of Program (Element 1)

5. Implement preventive actions ***to emphasize proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting. For ASTM A325 or ASTM A490 bolts, the preventive actions*** for storage, lubricant selection, and bolting and coating material selection ~~discussed in~~ ***will be in accordance with*** Section 2 of Research Council for Structural Connection publication “Specification for Structural Joints Using High-Strength Bolts” ~~for structural bolting fabricated from ASTM A325 and ASTM A490~~. **Program Element Affected: Preventive Actions (Element 2)**

6. Clarify procedures to state that evidence of cracking, spalling, scaling, ***discoloration,*** and leaching could indicate the presence of increased porosity and permeability ***due to mechanisms of aggressive chemical attack or leaching of calcium hydroxide and carbonation***. **Program Element Affected: Parameters Monitored or Inspected (Element 3)**

7. Expand the program to monitor accessible sliding surfaces for indications of significant loss of material due to wear or corrosion, and for accumulation of debris or dirt. Establish acceptance criteria for sliding surfaces as no significant loss of material due to wear or corrosion, and no debris or dirt that could restrict or prevent sliding of the surfaces, as required by design. **Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Acceptance Criteria (Element 6)**

8. Expand the program to monitor elastomeric structural sealants, seismic joint fillers, vibration isolators, and bearing pads for cracking, loss of material, and hardening. Supplement visual inspection of elastomeric elements with tactile inspection to detect hardening if the intended function is suspect. Establish acceptance criteria for elastomeric structural sealants, seismic joint fillers, bearing pads, and vibration isolation elements as no loss of material, cracking, or hardening that can lead to loss of intended function. **Program Elements Affected: Parameters Monitored or Inspected (Element 3), Detection of Aging Effects (Element 4), and Acceptance Criteria (Element 6)**

9. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to raw water and groundwater/soil environments that will include the following:

    a. Monitor raw water and groundwater chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year). Increase sampling locations to ensure that the results are representative of the groundwater in contact with structures within the scope of subsequent license renewal. Enter adverse results, which exceed water chemistry criteria, into the corrective action program.

    b. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for degradation due to the aggressive water chemistry, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to the potentially aggressive environment.

    c. Develop the initial engineering evaluations prior to the subsequent period of extended operation. Develop follow-up engineering evaluations on an interval not to exceed five years.

    d. If warranted based on the engineering evaluations, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to potentially aggressive groundwater/soil.

e. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R***-02*** tier 2 criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventive actions, additional evaluations, and future inspections.

Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Detection of Aging Effects (Element 4)

10. Monitor and trend ***indications of groundwater infiltration or*** through~~-wall~~ ***concrete*** ~~groundwater~~ leakage ~~infiltration volumes~~. If leakage volumes allow, procedures will be revised to clarify that water chemistry analysis should be considered for parameters including pH, as well as mineral, chloride, sulfate and iron content in the water to assess for potential impact on age-related degradation of concrete or steel reinforcement. This assessment may include engineering evaluation, more frequent inspections, or destructive testing of affected concrete to validate existing concrete properties, including concrete pH levels. **Program Elements Affected: Parameters Monitored or Inspected (Element 3) and Detection of Aging Effects (Element 4)**
11. Require that personnel performing inspections and evaluations meet the qualifications specified within ACI 349.3R***-02*** with respect to knowledge of inservice inspection of concrete and visual acuity requirements. **Program Element Affected: Detection of Aging Effects (Element 4)**
12. Evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas. **Program Element Affected: Detection of Aging Effects (Element 4)**
13. ~~Perform inspections to establish quantitative baseline inspection data prior to the subsequent period of extended operation for structures in which prior inspection results are inadequate to establish a quantitative baseline to allow for effective monitoring and trending.~~ ***Quantitative baseline inspection data will be established against acceptance criteria provided in the enhanced Structures Monitoring program prior to the subsequent period of extended operation. Previously performed inspections that were conducted using comparable acceptance criteria are acceptable in lieu of performing a new baseline inspection.*** **Program Element Affected: Monitoring and Trending (Element 5)**
14. Provide evaluation criteria for structural concrete using quantitative second tier criteria of Chapter 5 in ACI 349.3R***-02***. **Program Element Affected: Acceptance Criteria (Element 6)**
15. Clarify that loose bolts and nuts ~~and cracked bolts~~ are not acceptable unless accepted by engineering evaluation~~s~~. **Program Element Affected: Acceptance Criteria (Element 6)**

16. ***Provide additional guidance on visual indications such as exudations, surface staining, expansion causing structural deformation, relative movement or displacement, misalignment or distortion of attached components for detection of expansion due to alkali-aggregate reactivity in concrete. Program Element Affected: Detection of Aging Effects (Element 4)***
17. ***Locations of degraded steel structural components due to water in-leakage in the Unit 2 torus basement will be inspected on a two-year frequency. Program Element Affected: Detection of Aging Effects (Element 4)***

<u>Change # 15 – Revisions to Inspection of Water-Control Structures Program</u>

Affected SLRA sections: A.2.1.34, B.2.1.34

Affected SLRA Page Numbers: A-38, A-39, A-40, A-41, B-195, B-196, B-197, B-198, B-199

Description of Changes:

SLRA Section A.2.1.34 is being revised to:

- Clarify that the discharge headworks and the Units 2 and 3 Crib House forebay are in the scope of the program in the program description.
- Revise the program description for the submerged inspection of the discharge outfall structure to every three refueling cycles.
- Revise enhancement 3 to more closely align with the recommendations in NUREG-2191.
- Specify the revision year of ACI 349.3R in enhancement 5.
- Revise enhancement 6 to clarify that groundwater infiltration and through concrete leakage will be monitored and trended.
- Reword enhancement 8 for clarity.
- Specify the revision year of ACI 349.3R in enhancement 9.
- Specify the revision year of ACI 349.3R in enhancement 10.
- Revise enhancement 11 to more closely align with the recommendations in NUREG-2191.
- Add enhancement 12 to perform inspections of the discharge outfall structure below the waterline every three refueling cycles.
- Add enhancement 13 to require visual remote or diver inspections if the structure is not dewatered for inspection at least once every five years.

SLRA Section B.2.1.34 is being revised to:

- Clarify that the discharge headworks and the Units 2 and 3 Crib House forebay are in the scope of the program in the program description.
- Clarify in the program description that ASTM F1852 and ASTM F2280 were not used.
- Revise the program description for the submerged inspection of the discharge outfall structure to every three refueling cycles.
- Provide exception and justification for below the waterline inspection of the discharge outfall structure every three refueling cycles, outside of the five year recommended inspection frequency.
- Revise enhancement 3 to more closely align with the recommendations in NUREG-2191.
- Specify the revision year of ACI 349.3R in enhancement 5.
- Revise enhancement 6 to clarify that groundwater infiltration and through concrete leakage will be monitored and trended.

- Reword enhancement 8 for clarity.
- Specify the revision year of ACI 349.3R in enhancement 9.
- Specify the revision year of ACI 349.3R in enhancement 10.
- Revise enhancement 11 to more closely align with the recommendations in NUREG-2191.
- Add enhancement 12 to perform inspections of the discharge outfall structure below the waterline every three refueling cycles.
- Add enhancement 13 to require visual remote or diver inspections if the structure is not dewatered for inspection at least once every five years.

Revisions to the commitment list in SLRA Table A.5 are provided in Enclosure B of this submittal.

Accordingly, SLRA Sections A.2.1.34 and B.2.1.34 are revised as shown below.

SLRA Section A.2.1.34, Inspection of Water-Control Structures Associated with Nuclear Power Plants, pages A-38 through A-41, is revised as shown below:

A.2.1.34 Inspection of Water-Control Structures Associated with Nuclear Power Plants

The Inspection of Water-Control Structures Associated with Nuclear Power Plants aging management program is an existing condition monitoring program that consists of inspection and surveillance of water-control structures that are in scope for license renewal. These structures consist of the intake canals (including the bridge over the Units 2 and 3 intake canal), the Circulating Water Inlet Tunnel, the Crib Houses (including trash racks, traveling screen foundation, and stop logs), ***the discharge headworks, the Units 2 and 3 Crib House forebay,*** and the discharge outfall structure (including ice melt gate and deicing line connecting the discharge headworks to the Units 2 and 3 Crib House forebay).

The program includes concrete, reinforced concrete, structural steel, and structural bolting associated with the water-control structures. Parameters monitored are in accordance with Section C.2 of RG 1.127 and quantitative measurements are recorded for findings that exceed the acceptance criteria for applicable parameters monitored or inspected. Inspections will be performed at least once every five years for structural components that are not submerged. Submerged components associated with the discharge outfall structure ***will be***~~are~~ inspected once every ***three refueling cycles***~~10 years~~. All other submerged components are inspected at least once every five years.

Not included in this program is the Dresden Island Lock and Dam and various onsite tanks used for isolation condenser makeup. The Dresden Island Lock and Dam is operated and maintained by the Army Corps of Engineers and is not in scope for license renewal since it is not part of Dresden Nuclear Power Station.

The Inspection of Water-Control Structures Associated with Nuclear Power Plants aging management program will be enhanced to:

1. Add the following structures to the scope of the program:
    a. Bridge over the Units 2 and 3 intake canal
    b. Deicing Line
    c. Circulating Water Inlet Tunnel
    d. Embankments of the Unit 1 intake canal
    e. Embankments of the Units 2 and 3 intake canal
2. Explicitly include the following components within the scope of the program:
    a. Stop logs
    b. Trash racks
    c. Traveling screen foundations

3. Implement preventive actions ***to emphasize proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting. For ASTM A325 or ASTM A490 bolts, the preventive actions*** for storage, lubricant selection, and bolting and coating material selection ~~discussed in~~ ***will be in accordance with*** Section 2 of Research Council for Structural Connection publication "Specification for Structural Joints Using High-Strength Bolts" ~~for structural bolting fabricated from ASTM A325 and ASTM A490~~.

4. Perform above the waterline inspections of the discharge outfall structure every five years.

5. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to raw water and groundwater/soil environments that will include the following:

   a. Monitor raw water and groundwater chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year). Increase sampling locations to ensure that the results are representative of the groundwater in contact with structures within the scope of subsequent license renewal. Enter adverse results, which exceed water chemistry criteria, into the corrective action program.

   b. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for degradation due to the aggressive water chemistry, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to the potentially aggressive environment.

   c. Develop the initial engineering evaluations prior to the subsequent period of extended operation. Develop follow-up engineering evaluations on an interval not to exceed five years.

   d. If warranted based on the engineering evaluations, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to potentially aggressive groundwater/soil.

   e. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R***-02*** tier 2 criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventive actions, additional evaluations, and future inspections.

6. Monitor and trend ***indications of groundwater infiltration or*** through-~~wall~~ ***concrete*** ~~groundwater~~ leakage ~~infiltration volumes~~. If leakage volumes allow, procedures will be revised to clarify that water chemistry analysis should be considered for parameters including pH, as well as mineral, chloride, sulfate and iron content in the water to assess for potential impact on age-related degradation of concrete or steel reinforcement. This assessment may include engineering evaluation, more frequent inspections, or destructive testing of affected concrete to validate existing concrete properties, including concrete pH levels.

7. Evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas.

8. ~~Perform inspections to establish quantitative baseline inspection data prior to the subsequent period of extended operation for structures in which prior inspection results are inadequate to establish a quantitative baseline to allow for effective monitoring and trending.~~ ***Quantitative baseline inspection data will be established against acceptance criteria provided in the enhanced Inspection of Water-Control Structures Associated with Nuclear Power Plants program prior to the subsequent period of extended operation. Previously performed inspections that were conducted using comparable acceptance criteria are acceptable in lieu of performing a new baseline inspection.***

9. Provide evaluation criteria for structural concrete using quantitative second tier criteria of Chapter 5 in ACI 349.3R***-02***.

10. Require that personnel performing inspections and evaluations meet the qualifications specified within ACI 349.3R***-02*** with respect to knowledge of inservice inspection of concrete and visual acuity requirements.

11. Clarify that loose bolts and nuts ~~and cracked bolts~~ are not acceptable unless accepted by engineering evaluation~~s~~.

12. Perform below the waterline inspections of the discharge outfall structure every three refueling cycles.

13. Require visual inspections of submerged concrete structural components by dewatering a structure or by a diver or remote imaging equipment if the structure is not dewatered at least once every five (5) years.

The program will be enhanced and the initial engineering evaluation will be completed no later than six months prior to the subsequent period of extended operation. Baseline inspections will be completed no later than the last refueling outage prior to the subsequent period of extended operation.

SLRA Section B.2.1.34, Inspection of Water-Control Structures Associated with Nuclear Power Plants, Program Description, pages B-195 and B-196, is revised as shown below:

B.2.1.34 Inspection of Water-Control Structures Associated with Nuclear Power Plants

Program Description

The Inspection of Water-Control Structures Associated with Nuclear Power Plants aging management program is an existing condition monitoring program that consists of inspection and surveillance of water-control structures that are in scope for license renewal. These structures consist of the intake canals (including the bridge over the Units 2 and 3 intake canal), the Circulating Water Inlet Tunnel, the Crib Houses (including trash racks, traveling screen foundation, and stop logs), ***the discharge headworks, the Units 2 and 3 Crib House forebay,*** and the discharge outfall structure (including ice melt gate and deicing line connecting the discharge headworks to the Units 2 and 3 Crib House forebay).

Structural component and commodities monitored under this program include steel bolting, concrete, concrete anchors and curbs, reinforced concrete members such as interior and exterior walls, slabs, beams, panels, columns, foundations and subfoundations, hatches and plugs; as well as structural steel, embankments, cast-iron ice melt gate, and equipment supports and foundations. ***Structural bolting consisting of ASTM F1852 and ASTM F2280 were not used within the scope of this program.***

The program manages loss of material, cracking, loss of bond, increase in porosity and permeability, loss of strength, loss of form, and change in material properties. Environments include air-indoor uncontrolled, air-outdoor, raw water, water flowing and water standing.

The program addresses age-related deterioration, degradation due to extreme environmental conditions, and the effects of natural phenomena that may affect the intended functions of the water-control structures and components in the scope of this program. The monitoring methods are effective in detecting the applicable aging effects and the frequency of monitoring is adequate to prevent the loss of intended function due to significant age-related degradation. Elements of the program are designed to provide records of periodic inspections and evaluations of structural conditions to detect age-related deterioration and degradation and to initiate maintenance activities and corrective actions so that the consequences of age-related deterioration and degradation can be prevented or mitigated in a timely manner.

In general, parameters monitored are in accordance with Section C.2 of U. S. NRC Regulatory Guide (RG) 1.127, “Inspection of Water Control Structures Associated with Nuclear Power Plants”, and quantitative measurements are recorded for findings that exceed the acceptance criteria for applicable parameters monitored or inspected. DNPS is not currently committed to the requirements in NRC RG 1.127 but has been implementing the guidance of RG 1.127 for the structures in scope for license renewal through station procedures, work orders, and inspections. The aging management program is based on the guidance provided in NRC RG 1.127 and American Concrete Institute (ACI) 349.3R-02. Structures exposed to aggressive raw water and ground water require additional plant-specific investigation.

Structures located underwater will not be accessible for evaluation with the same level of visual acuity as structures above water. Inspections will be implemented that establish the condition of these structures by using divers, an equivalent inspection method to divers, or by dewatering, as well as by considering the conditions of the exposed portions of the structures, at the waterline and above, which can serve as an indicator of conditions underwater. These measures allow for the characterization of long-term aging effects to a level of detail that can be used to determine whether additional inspection measures are warranted, and to prioritize any further inspection or evaluation efforts so that this aging management program will be effective in assuring that intended functions of submerged structures are maintained consistent with the current licensing basis for the subsequent period of extended operation.

Inspections will be performed at least once every five years for structural components that are not submerged. Submerged components in the discharge outfall structure ***will be***~~are~~ visually inspected at least once every ***three refueling cycles*** ~~10 years~~. The inspection activities include cleaning of areas covered by silt, vegetation, or marine growth to allow for inspections. The raw water at DNPS is not considered to be aggressive based on chemistry records that indicate pH, sulfates, and chlorides are below the threshold limits to be considered aggressive. The submerged components in the Unit 2 and 3 Crib House are currently inspected within the five year frequency window. The submerged components in the Crib Unit 2 and 3 Crib House are of similar design and exposed to equivalent conditions and, as such, the results of the inspections of the submerged components in the Units 2 and 3 Crib House are representative of the condition of submerged components in the discharge outfall structure degradation. Based upon the results of completed inspections of submerged components within the scope of the program and the non-aggressive raw water at DNPS, the ~~current~~ ***three refueling cycle*** ~~10-year~~ inspection frequency for submerged components in the discharge outfall structure provides reasonable assurance that aging will be adequately managed such that intended functions are maintained consistent with the current licensing basis during the subsequent period of extended operation. In addition, the program will be enhanced to perform inspections of the above the waterline components for the discharge outfall structure on a five year frequency, including the concrete at the waterline, and will provide for timely identification of significant aging issues that could potentially impact the structure intended function.

Not included in this program is the Dresden Island Lock and Dam and various onsite tanks used for isolation condenser makeup. The Dresden Island Lock and Dam is operated and maintained by the Army Corps of Engineers and is not in scope for license renewal since it is not part of Dresden Nuclear Power Station.

The Inspection of Water-Control Structures Associated with Nuclear Power Plants aging management program is implemented through the Structures Monitoring (B.2.1.33) program for the associated in scope structures.

SLRA Section B.2.1.34, Inspection of Water-Control Structures Associated with Nuclear Power Plants, Exceptions to NUREG-2191, page B-197, is revised as shown below:

Exceptions to NUREG-2191

~~None.~~

1. ***NUREG-2191, Chapter XI.S7, states periodic inspections are to be performed at least once every five years. The submerged discharge outfall structure will be inspected every three refueling cycles. Program Elements Affected: Detection of Aging Effects (Element 4)***

Justification for Exception

The discharge outfall structure is submerged in non-aggressive raw water and was last inspected in 2019 for Unit 2 and 2020 for Unit 3 with no consequential or significant degradation noted in both inspections.

The Unit 2 and 3 Crib House inspections are inspected within the five-year frequency window. The submerged components in the Crib Unit 2 and 3 Crib House are of similar design and exposed to equivalent conditions and, as such, the results of the inspections of the submerged components in the Units 2 and 3 Crib House are representative of the condition of submerged components in the discharge outfall structure. Based upon the results of completed inspections of submerged components within the scope of the program and the non-aggressive raw water at DNPS, the three refueling cycle inspection frequency for the submerged discharge outfall structure inspection provides reasonable assurance that discharge outfall structure will continue to perform its intended function during the subsequent period of extended operation.

The Enhancement list for SLRA Section B.2.1.34, Inspection of Water-Control Structures Associated with Nuclear Power Plants, pages B-197 through B-199, is revised as shown below:

Enhancements

In the elements identified below, the Inspection of Water-Control Structures Associated with Nuclear Power Plants program will be enhanced to:

1. Add the following structures to the scope of the program:
   a. Bridge over the Units 2 and 3 intake canal
   b. Deicing Line
   c. Circulating Water Inlet Tunnel
   d. Embankments of the Unit 1 intake canal
   e. Embankments of the Units 2 and 3 intake canal

   Program Element Affected: Scope of Program (Element 1)

2. Explicitly include the following components within the scope of the program:
   a. Stop logs
   b. Trash racks
   c. Traveling screen foundations

   Program Element Affected: Scope of Program (Element 1)

3. Implement preventive actions ***to emphasize proper selection of bolting material and lubricants, and appropriate installation torque or tension to prevent or minimize loss of bolting preload and cracking of high-strength bolting. For ASTM A325 or ASTM A490 bolts, the preventive actions*** for storage, lubricant selection, and bolting and coating material selection ~~discussed in~~ ***will be in accordance with*** Section 2 of Research Council for Structural Connection publication "Specification for Structural Joints Using High-Strength Bolts" ~~for structural bolting fabricated from ASTM A325 and ASTM A490~~.
   Program Element Affected: Preventive Actions (Element 2)

4. Perform above the waterline inspections of the discharge outfall structure every five years. **Program Element Affected: Detection of Aging Effects (Element 4)**

5. Develop a new implementing procedure or revise an existing implementing procedure to address aging management of inaccessible areas exposed to raw water and groundwater/soil environments that will include the following:
   a. Monitor raw water and groundwater chemistry, for pH, chlorides, and sulfates, on a frequency not to exceed five years that accounts for seasonal variations (e.g., quarterly monitoring every fifth year). Increase sampling locations to ensure that the results are representative of the groundwater in contact with structures within the scope of subsequent license renewal. Enter adverse

results, which exceed water chemistry criteria, into the corrective action program.

b. Develop engineering evaluations to evaluate the water chemistry results to assess the impact, if any, on below-grade concrete, including the potential for degradation due to the aggressive water chemistry, as well as consideration of current conditions. As part of the engineering evaluations, determine if additional actions are warranted, which might include enhanced inspection techniques and/or increased frequency, destructive testing, and focused inspections of representative accessible (leading indicator) or below grade, inaccessible concrete structural elements exposed to the potentially aggressive environment.

c. Develop the initial engineering evaluations prior to the subsequent period of extended operation. Develop follow-up engineering evaluations on an interval not to exceed five years.

d. If warranted based on the engineering evaluations, perform focused inspections of representative, accessible (leading indicator) structural elements, or if accessible areas will not be leading indicators for the potential aging mechanisms, excavate and inspect buried concrete elements exposed to potentially aggressive groundwater/soil.

e. If degraded concrete is identified, as part of the focused inspections of leading indicators (representative, accessible or exposed inaccessible concrete), enter adverse results that exceed ACI 349.3R***-02*** tier 2 criteria into the corrective action program, and expose inaccessible concrete so that the extent of the condition can be determined, baseline conditions documented, and additional actions identified such as repairs, new preventive actions, additional evaluations, and future inspections.

Program Element Affected: Detection of Aging Effects (Element 4)

6. Monitor and trend ***indications of groundwater infiltration or*** through~~-wall~~ ***concrete*** ~~groundwater~~ leakage ~~infiltration volumes~~. If leakage volumes allow, procedures will be revised to clarify that water chemistry analysis should be considered for parameters including pH, as well as mineral, chloride, sulfate and iron content in the water to assess for potential impact on age-related degradation of concrete or steel reinforcement. This assessment may include engineering evaluation, more frequent inspections, or destructive testing of affected concrete to validate existing concrete properties, including concrete pH levels.

   Program Element Affected: Detection of Aging Effects (Element 4)

7. Evaluate the acceptability of inaccessible areas when conditions exist in accessible areas that could indicate the presence of, or result in, degradation to such inaccessible areas. **Program Element Affected: Detection of Aging Effects (Element 4)**

8. ~~Perform inspections to establish quantitative baseline inspection data prior to the subsequent period of extended operation for structures in which prior inspection results are inadequate to establish a quantitative baseline to allow for effective~~

~~monitoring and trending.~~ ***Quantitative baseline inspection data will be established against acceptance criteria provided in the enhanced Inspection of Water-Control Structures Associated with Nuclear Power Plants program prior to the subsequent period of extended operation. Previously performed inspections that were conducted using comparable acceptance criteria are acceptable in lieu of performing a new baseline inspection.*** **Program Element Affected: Monitoring and Trending (Element 5)**

9. Provide evaluation criteria for structural concrete using quantitative second tier criteria of Chapter 5 in ACI 349.3R***-02***. **Program Element Affected: Acceptance Criteria (Element 6)**

10. Require that personnel performing inspections and evaluations meet the qualifications specified within ACI 349.3R***-02*** with respect to knowledge of inservice inspection of concrete and visual acuity requirements. **Program Element Affected: Acceptance Criteria (Element 4)**

11. Clarify that loose bolts and nuts ~~and cracked bolts~~ are not acceptable unless accepted by engineering evaluation~~s~~. **Program Element Affected: Acceptance Criteria (Element 6)**

12. Perform below the waterline inspections of the discharge outfall structure every three refueling cycles. Program Elements Affected: Detection of Aging Effects (Element 4)

13. Require visual inspections of submerged concrete structural components by dewatering a structure or by a diver or remote imaging equipment if the structure is not dewatered at least once every five (5) years. Program Elements Affected: Detection of Aging Effects (Element 4)

The program will be enhanced and the initial engineering evaluation will be completed no later than six months prior to the subsequent period of extended operation. Baseline inspections will be completed no later than the last refueling outage prior to the subsequent period of extended operation.