



May 6, 2021

L-2021-102
10 CFR 54.17

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
11545 Rockville Pike
One White Flint North
Rockville, MD 20852-2746

Point Beach Nuclear Plant Units 1 and 2
Dockets 50-266 and 50-301
Renewed License Nos. DPR-24 and DPR 27

SUBSEQUENT LICENSE RENEWAL APPLICATION - AGING MANAGEMENT SUPPLEMENT 2

References:

1. NextEra Energy Point Beach, LLC (NEPB) Letter NRC 2020-0032 dated November 16, 2020, Application for Subsequent Renewed Facility Operating Licenses (ADAMS Package Accession No. ML20329A292)
2. U.S. Nuclear Regulatory Commission (NRC) Letter dated January 15, 2021, Point Beach Nuclear Plant, Units 1 and 2 - Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Notice of Opportunity to Request a Hearing Regarding the NextEra Energy Point Beach, LLC Application for Subsequent License Renewal (EPID No. L-2020-SLR-0002) (ADAMS Accession No. ML21006A417)
3. NRC Letter dated January 15, 2021, Point Beach Nuclear Plant, Units 1 and 2 - Aging Management Audit Plan Regarding the Subsequent License Renewal Application Review (ADAMS Accession No. ML21007A260)
4. NEPB Letter L-2021-081 dated April 21, 2021, Subsequent License Renewal Application - Aging Management Supplement 1 (ADAMS Accession No. ML21111A155)

NEPB, owner and licensee for Point Beach Nuclear Plant (PBN) Units 1 and 2, has submitted a subsequent license renewal application (SLRA) for the Facility Operating Licenses for PBN Units 1 and 2 (Reference 1). On January 15, 2021, the NRC determined that NEPB's SLRA was acceptable and sufficient for docketing and issued the regulatory audit plan for the aging management portion of the SLRA review (References 2 and 3). During this audit conducted between January 19, 2021 to March 26, 2021, NEPB agreed to supplement the SLRA (Enclosure 3, Attachment 1 of Reference 1) with new or clarifying information. The attachments to this letter provide that information and do not incorporate or otherwise affect any new or clarifying information provided in Reference 4.

For ease of reference, the index of attachment topics is provided on page 3 of this letter. In each attachment, changes are described along with the affected section(s) and page number(s) of the docketed SLRA (Enclosure 3 Attachment 1) where the changes are to apply. For clarity, revisions to the SLRA are provided with deleted text by ~~strikethroughs~~ and inserted text by **bold red underline**. Revisions to SLRA tables are shown by providing excerpts from each affected table.

NextEra Energy Point Beach, LLC

6610 Nuclear Road, Two Rivers, WI 54241

Pursuant to 10 CFR 50.91(b)(1), a copy of this letter is being forwarded to the State of Wisconsin.

Should you have any questions regarding this submittal, please contact me at (561) 691-2294 or William.Maher@fpl.com.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on the 6th day of May 2021.

Sincerely,

William D. Maher
Licensing Director - Nuclear Licensing Projects

Cc: Administrator, Region III, USNRC
Project Manager, Point Beach Nuclear Plant, USNRC
Resident Inspector, Point Beach Nuclear Plant, USNRC
Public Service Commission Wisconsin

Attachments Index	
Attachment No.	PBN SLRA Enclosure 3 Attachment 1 Topic
1	Correction to SRP Item Number 3.6-1, 005 in SLRA Table 3.6.2-1: Electrical Commodities – Summary of Aging Management Evaluation
2	Recurring Internal Corrosion (AMR changes, Further Evaluations, OCCW AMP, Fire Water AMP, and Internal Surfaces AMP)

**Correction to SRP Item Number 3.6-1, 005 in SLRA Table 3.6.2-1: Electrical Commodities
– Summary of Aging Management Evaluation**

Affected SLRA Sections: Table 3.6.2-1 (Section 3.6)

SLRA Page Numbers: 3.6-22

Description of Change:

Corrected SRP item number 3.6-1, 005 in SLRA Table 3.6.2-1 to read “Transmission connectors” consistent with the corresponding SRP item number in Table 3.6-1.

SLRA Section 3.6, Table 3.6.2-1, page 3.6-22 is revised as follows:

Table 3.6.2-1: Electrical Commodities – Summary of Aging Management Evaluation								
Structure and/or Component	Component Intended Function	Material	Environment	Aging Effect / Mechanism	Aging Management Program (AMP) / TLAA	NUREG-2191 Item	SRP Item	Notes
High-voltage electrical insulators	Insulate (electrical)	Porcelain; malleable iron; aluminum; galvanized steel; cement	Air – outdoor	Reduced electrical insulation resistance	High-Voltage Insulators (B.2.3.44)	VI.A.LP-28	3.6-1, 003	A
Switchyard bus and connections	Electrical Continuity	Aluminum; copper; bronze; stainless steel; galvanized steel	Air – outdoor	None	None	VI.A.LP-39	3.6-1, 006	I
Transmission conductors	Electrical Continuity	Aluminum	Air – outdoor	None	None	VI.A.LP-46	3.6-1, 021	I
Transmission conductors connectors	Electrical Continuity	Aluminum; steel	Air – outdoor	None	None	VI.A.LP-48	3.6-1, 005	I
Transmission conductors	Electrical Continuity	Aluminum; steel	Air – outdoor	None	None	VI.A.LP-38	3.6-1, 004	I
Transmission conductors	Electrical Continuity	Aluminum; steel	Air – outdoor	None	None	VI.A.LP-47	3.6-1, 007	I

Recurring Internal Corrosion (AMR Changes, Further Evaluations, OCCW AMP, Fire Water AMP, and Internal Surfaces AMP)

Affected SLRA Sections: Table 3.3-1, Table 3.3.2-2, Table 3.3.2-5, Table 3.3.2-6, Table 3.3.2-8, Table 3.3.2-12, Table 3.4-1, Table 3.4.2-3, Table 16-3 (Appendix A, Section 16.4), and Sections 3.2.2.2.7, 3.3.2.2.7, 3.4.2.2.6, 16.2.2.11 (Appendix A), 16.2.2.16 (Appendix A), 16.2.2.25 (Appendix A), B.2.3.11, B.2.3.16, and B.2.3.25

SLRA Page Numbers: 3.2-12, 3.3-25, 3.3-55, 3.3-104, 3.3-153, 3.3-177, 3.3-199, 3.3-261, 3.4-10, 3.4-30, 3.4-81, A-20, A-24, A-30, A-79, B-105, B-106, B-131, B-133, B-184, B-188

Description of Change:

Based on an additional review of operating experience (OE) at Point Beach (PBN), carbon steel piping in both safety related portions and non-safety related portions of the service water system exposed to Lake Michigan raw water were determined to have experienced loss of material due to recurring internal corrosion. Although the OE was limited to piping in the service water system, it is conservatively assumed that all carbon steel components exposed to Lake Michigan raw water in the service water, circulating water and fire protection systems are potentially susceptible to recurring internal corrosion.

The further evaluations in subsequent license renewal application (SLRA) Sections 3.3.2.2.7 and 3.4.2.2.6, SLRA Table 3.3-1 item 127, SLRA Table 3.3-1 item 061, the SLRA Summary of Aging Management Evaluation Tables that have carbon steel components exposed to Lake Michigan raw water, and the Fire Water System, Open-Cycle Cooling Water System, and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components Aging Management Programs (AMPs) are updated to reflect management of loss of material due to recurring internal corrosion.

Changes to the Open-Cycle Cooling Water System AMP, Fire Water System AMP, and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP primarily included clarifying how recurring internal corrosion will be managed throughout the subsequent period of extended operation (SPEO). An Element 7 enhancement was added to the Fire Water System AMP to adjust inspections as applicable when degradation is identified, which is also consistent with an Element 7 enhancement made for the Open-Cycle Cooling Water System AMP. The enhancement to the Fire Water System AMP is in addition to the enhancements that were added by L-2021-081, Attachment 14 (ML211111A155).

SLRA Section 3.2.2.2.7, page 3.2-12 is revised as follows:

~~PBN operating experience over the past 10 years shows no instances that meet the criteria of recurring internal corrosion for metals containing raw water, waste water, or treated water; therefore, recurring internal corrosion is not an applicable aging effect at PBN. There is no need to augment the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP due to recurring internal corrosion.~~

PBN operating experience over the past 10 years shows no instances that meet the criteria of recurring internal corrosion for metallic components containing treated water in the Engineered Safety Features Systems. There is no raw water or waste water in the Engineered Safety Features Systems; therefore, recurring internal corrosion is not an applicable aging effect at PBN for the Engineered Safety Features Systems.

SLRA Section 3.3.2.2.7, page 3.3-25 is revised as follows:

~~Site OE over the past 10 years shows some limited recurrence of external corrosion for mechanical components from leakage and an instance of > 50 percent wall loss in heat exchanger tubes. However, there have been no corrosion issues that meet the criteria of recurring internal corrosion. Therefore, recurring internal corrosion is not an applicable aging effect for metals in PBN systems containing raw water, waste water, closed cycle cooling water, or treated water. As such, credited PBN AMPs such as Fire Water System (B.2.3.16), Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25), and Open-Cycle Cooling Water System (B.2.3.11), do not require augmentation due to recurring internal corrosion.~~

Site OE does not lead to the conclusion that treated water and waste water systems have experienced recurring internal corrosion. However, site OE does indicate that carbon steel components exposed to Lake Michigan raw water in the service water system have experienced recurring internal corrosion. Therefore, it is assumed that all carbon steel components in systems that are supplied by Lake Michigan water have the potential to experience recurring internal corrosion.

The auxiliary systems that include carbon steel components that are exposed to Lake Michigan raw water include the following:

- **Component Cooling Water**
- **Service Water**
- **Fire Protection**
- **Emergency Power**
- **Circulating Water**

The Fire Water System (B.2.3.16), Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25), and Open-Cycle Cooling Water System (B.2.3.11) AMPs are enhanced to manage loss of material due to recurring internal corrosion.

There are existing program activities that manage recurring internal corrosion. These activities are as follows and will be expanded to apply to carbon steel components in the scope of SLR subject to AMR and exposed to Lake Michigan raw water.

Method of Examination:

Non Destructive Examination (NDE) methods to inspect for internal system degradation due to corrosion are used. Tangential Radiography (RT) and Ultrasonic Thickness (UT) scanning are the most frequently used NDE techniques. Other NDE techniques such as visual (VT) from the inside and Guided Wave (GW) may be used when appropriate.

Selection of Examination Locations:

The AMP Coordinator selects examination locations with emphasis on selecting locations in the most susceptible (i.e. highest risk) piping sections of the system.

SLRA Section 3.3.2.2.7, page 3.3-25 revision continued:

- Areas attaining 50% (or greater) wall loss shall be re-inspected on an as needed basis based on estimates of remaining service life to reach code required minimum wall thickness. Determination of the inspection frequency should be documented in the Action Request (AR) initiated for the condition.
- Previously inspected areas in which remaining wall thickness is >50% but less than 87.5% require follow up inspections as determined necessary in the associated AR and/or by the AMP Coordinator.
- Additional first time or repetitive inspections shall be chosen based on system walkdown with system engineering input.

Management of the loss of material due to recurring internal corrosion aging effect is discussed in the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.3.25), Open-Cycle Cooling Water System (Section B.2.3.11), and Fire Water System (Section B.2.3.16) AMPs.

SLRA Table 3.3-1, page 3.3-55 is revised as follows:

Table 3.3-1: Summary of Aging Management Evaluations for the Auxiliary Systems					
Item Number	Component	Aging Effect/Mechanism	Aging Management Program (AMP)/TLAA	Further Evaluation Recommended	Discussion
3.3-1, 127	Metallic piping, piping components, tanks exposed to closed-cycle cooling water, raw water, raw water (potable), treated water, waste water	Loss of material due to recurring internal corrosion	AMP XI.M20, "Open-Cycle Cooling Water System," AMP XI.M27, "Fire Water System," or AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"	Yes (SRP-SLR Section 3.3.2.2.7)	<p>Not applicable. OE shows no instances that meet the criteria of recurring internal corrosion.</p> <p><u>Consistent with NUREG-2191 with exception for the Open-Cycle Cooling Water System AMP.</u></p> <p><u>Based on plant specific OE, recurring internal corrosion is an applicable effect for carbon steel components in Lake Michigan raw water systems but not in waste water systems or treated water systems. The Open-Cycle Cooling Water System, Fire Water System, and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMPs are used to manage the loss of material due to recurring internal corrosion aging effect for carbon steel components exposed to Lake Michigan raw water in the Auxiliary Systems.</u></p> <p><u>Further evaluation is documented in Section 3.3.2.2.7</u></p>

SLRA Table 3.3.2-2 is revised as follows to add the following rows:

Table 3.3.2-2: Component Cooling Water – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Heat exchanger (component cooling channel head)</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>D</u>

SLRA Table 3.3.2-5 is revised as follows to add the following rows:

Table 3.3.2-5: Service Water System – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Expansion joint</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Heat exchanger (blowdown vent condenser channel head)</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>
<u>Hose reel</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Piping</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>
<u>Piping</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Piping and piping components</u>	<u>Structural integrity (attached)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>

Table 3.3.2-5: Service Water System – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Sight glass</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>
<u>Sight glass</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Strainer</u>	<u>Filter</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Strainer</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>
<u>Strainer</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Thermowell</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Valve body</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 4</u>
<u>Valve body</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>

Plant Specific Notes

1. The Open Cycle Cooling Water (B.2.3.11) AMP is used to manage wall thinning due to erosion for the interior surfaces of components within the service water system exposed to raw water within the scope of the GL 89-13 program.
2. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP is used to manage wall thinning due to erosion for the interior surfaces of components within the service water system exposed to raw water not within the scope of the GL 89-13 program (that is non-essential loads that can be automatically **isolated** from essential loads or discharge/return components).
3. Boric acid evaporator vacuum system heat exchanger (HX-702) shell contains tubes (coil) that are in the service water pressure boundary and cannot be isolated. Conservatively, any condensation or coil leakage inside the shell could leak onto safety-related SSCs in the vicinity with shell degradation due to aging.
- 4. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP is used to manage the loss of material due to recurring internal corrosion aging effect.**

SLRA Table 3.3.2-6 is revised as follows to add the following rows:

Table 3.3.2-6: Fire Protection System – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Hose reel</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Orifice</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Orifice</u>	<u>Throttle</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Piping</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Strainer</u>	<u>Filter</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Strainer</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Tank (accumulator)</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>
<u>Valve body</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Fire Water System (B.2.3.16)</u>	<u>VII.G.A-400</u>	<u>3.3-1, 127</u>	<u>A</u>

SLRA Table 3.3.2-8 is revised as follows to add the following rows:

Table 3.3.2-8: Emergency Power System – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Heat exchanger (G-01/02 EDG coolant channel head)</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>
<u>Heat exchanger (G-01/02 EDG coolant tubesheet)</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Open-Cycle Cooling Water System (B.2.3.11)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>B</u>

SLRA Table 3.3.2-12 is revised as follows to add the following rows:

Table 3.3.2-12: Circulating Water System – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Piping</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 2</u>
<u>Valve body</u>	<u>Leakage boundary (spatial)</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VII.C1.A-400</u>	<u>3.3-1, 127</u>	<u>E, 2</u>

Plant Specific Notes

1. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP is enhanced to is used to manage the wall thinning due to erosion aging effect.
2. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP is used to manage the loss of material due to recurring internal corrosion aging effect.

SLRA Section 3.4.2.2.6, page 3.4-10 is revised as follows:

~~A review of PBN OE identified no corrosion issues that meet the criteria of ‘recurring internal corrosion’ for raw water, waste water, closed cycle cooling water, and treated water. Therefore, recurring internal corrosion is not an applicable aging effect for the Steam and Power Conversion Systems. As such, credited PBN AMPs, such as Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25), do not require augmentation due to recurring internal corrosion.~~

Site OE does not lead to the conclusion that treated water and waste water systems have experienced recurring internal corrosion. However, site OE does indicate that carbon steel components exposed to Lake Michigan raw water in the service water system have experienced recurring internal corrosion. Therefore, carbon steel components in systems that are supplied by Lake Michigan water have the potential to experience recurring internal corrosion. The new Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25) AMP includes activities to manage loss of material due to recurring internal corrosion.

There are existing program activities that manage recurring internal corrosion. These activities are as follows and will be expanded to apply to carbon steel components in the scope of SLR subject to AMR and exposed to Lake Michigan raw water.

Method of Examination:

Non Destructive Examination (NDE) methods to inspect for internal system degradation due to corrosion are used. Tangential Radiography (RT) and Ultrasonic Thickness (UT) scanning are the most frequently used NDE techniques. Other NDE techniques such as visual (VT) from the inside and Guided Wave (GW) may be used when appropriate.

Selection of Examination Locations:

The AMP Coordinator selects examination locations with emphasis on selecting locations in the most susceptible (i.e. highest risk) piping sections of the system.

- **Areas attaining 50% (or greater) wall loss shall be re-inspected on an as needed basis based on estimates of remaining service life to reach code required minimum wall thickness. Determination of the inspection frequency should be documented in the Action Request (AR) initiated for the condition.**
- **Previously inspected areas in which remaining wall thickness is >50% but less than 87.5% require follow up inspections as determined necessary in the associated AR and/or by the AMP Coordinator.**
- **Additional first time or repetitive inspections shall be chosen based on system walkdown with system engineering input.**

Management of the loss of material due to recurring internal corrosion aging effect is discussed in the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (Section B.2.3.25) AMP.

SLRA Table 3.4-1, page 3.4-30 is revised as follows:

Table 3.4-1: Summary of the Aging Management Evaluations for the Steam and Power Conversion Systems					
Item Number	Component	Aging Effect / Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
3.4-1, 061	Metallic piping, piping components, tanks exposed to raw water, waste water	Loss of material due to recurring internal corrosion	AMP XI.M20, "Open-Cycle Cooling Water System," or AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components"	Yes (SRP-SLR Section 3.4.2.2.6)	<p>Not used. There are no components exposed to waste water or raw water susceptible to recurring internal corrosion in the Steam and Power Conversion Systems.</p> <p><u>Consistent with NUREG-2191.</u></p> <p><u>Based on plant specific OE, recurring internal corrosion is an applicable effect for carbon steel components in Lake Michigan raw water systems but not in waste water systems. The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP is used to manage the loss of material due to recurring internal corrosion aging effect for carbon steel components exposed to Lake Michigan raw water in the Steam and Power Conversion Systems.</u></p> <p><u>Further evaluation is documented in Section 3.4.2.2.6.</u></p>

SLRA Table 3.4.2-3 is revised as follows to add the following rows:

Table 3.4.2-3: Auxiliary Feedwater – Summary of Aging Management Evaluation								
Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-2191 Item	Table 1 Item	Notes
<u>Piping</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VIII.A.S-400b</u>	<u>3.4-1, 061</u>	<u>A</u>
<u>Valve body</u>	<u>Pressure boundary</u>	<u>Carbon steel</u>	<u>Raw water (int)</u>	<u>Loss of material</u>	<u>Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B.2.3.25)</u>	<u>VIII.A.S-400b</u>	<u>3.4-1, 061</u>	<u>A</u>

SLRA Appendix A, Section 16.2.2.11, page A-20 is revised as follows:

intended to identify components (e.g., tubes, plugs) with degradation that may need to be removed from service (e.g., tubes), repaired, or replaced, as appropriate.

The AMP is modeled after NEI 97-06, "Steam Generator Program Guidelines" and incorporates the referenced EPRI Guidelines of NEI 97-06.

Volumetric inspections are performed on steam generator tubes to identify degradation such as primary water stress corrosion cracking (PWSCC), outer diameter stress corrosion cracking (ODSCC), and loss of material due to foreign objects and tube support structures. General visual inspections are also performed to identify any evidence of cracking, loss of material or corrosion where accessible. The AMP includes a degradation assessment to determine the type and location of flaws to which the tube may be susceptible, and implementation of inspection methods capable of detecting those forms of degradation are addressed.

This AMP also performs general visual inspections of the steam generator heads (internal surfaces) looking for evidence of cracking or loss of material (e.g., rust stains). Additionally, the AMP includes foreign material exclusion as a means to inhibit wear degradation, and secondary side maintenance activities, such as sludge lancing, for removing deposits that may contribute to component degradation.

16.2.2.11. Open-Cycle Cooling Water System

The PBN Open-Cycle Cooling Water System AMP is an existing AMP, previously known as the Open Cycle Cooling (Service) Water System Surveillance Program, that manages aging effects caused by exposure of internal surfaces of metallic components in water systems (e.g., piping, piping components, valves, piping elements, and heat exchangers) to raw, untreated (e.g., service) water. The PBN Open-Cycle Cooling Water System AMP relies, in part, on implementing the response to NRC Generic Letter (GL) 89-13, "Service Water System Problems Affecting Safety-Related Equipment" and subsequent commitment changes. This AMP manages aging effects through: (a) surveillance and control to significantly reduce the incidence of flow blockage problems as a result of biofouling, (b) tests to verify heat transfer of heat exchangers, and (c) routine inspection and maintenance so that corrosion, erosion, protective coating failure, fouling, and biofouling cannot degrade the performance of systems serviced by the open-cycle cooling water (service water) system. Inspection methods include visual, ultrasonic testing (UT), eddy current testing (ECT), and radiography. This AMP also includes enhancements to the guidance in NRC GL 89-13 that address OE such that aging effects are adequately managed. **This AMP manages carbon steel components exposed to Lake Michigan raw water in which potential recurring internal corrosion may become evident based on a search of site-specific OE.**

SLRA Appendix A, Section 16.2.2.16 [Fire Water System], page A-24 is revised as follows:

provide reasonable assurance that the fire water systems are capable of performing their intended function. Inspections and testing are performed in accordance with the nuclear insurance carrier's fire protection system testing requirements and generally follows the guidance of applicable NFPA Codes and Standards.

The water-based fire protection system is normally maintained at required operating pressure and is monitored such that loss of system pressure is immediately detected and corrective actions are initiated. Piping wall thickness measurements are conducted when visual inspections detect surface irregularities indicative of unexpected levels of degradation. When the presence of sufficient organic or inorganic material sufficient to obstruct piping or sprinklers is detected, the material is removed, the source of the material is identified, and the source is corrected. Inspections and tests follow site procedures that include inspection parameters for items such as lighting, distance, offset, presence of protective coatings, and cleaning processes for an adequate examination. **This AMP manages carbon steel, components exposed to Lake Michigan raw water in which potential recurring internal corrosion may become evident based on a search of site-specific OE.**

SLRA Appendix A, Section 16.2.2.25, page A-30 is revised as follows:

16.2.2.25. Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

The PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP is a new AMP that will manage loss of material, cracking, reduction of heat transfer due to fouling, flow blockage, and hardening or loss of strength of polymeric materials. Applicable environments will include air, gas, condensation, diesel exhaust, water, fuel oil, and lubricating oil. Some inspections and activities within the scope of the new AMP were previously performed by the PBN Periodic Surveillance and Preventive Maintenance Program.

The AMP will consist of visual inspections of accessible internal surfaces of piping, piping components, ducting, heat exchanger components, polymeric and elastomeric components, and other components. Surface examinations or ASME Code Section XI VT-1 examinations will be conducted to detect cracking of stainless steel and aluminum components. Aging effects associated with items (except for elastomers) within the scope of the PBN Open-Cycle Cooling Water AMP, the PBN Closed Treated Water Systems AMP, and the PBN Fire Water System AMP are not managed by this AMP. This AMP will not manage **carbon steel** components **exposed to Lake Michigan raw water** in which **potential** recurring internal corrosion is **may become** evident based on a search of site-specific OE-conducted during the ~~SLRA~~ development.

SLRA Appendix A, Section 16.4, Table 16-3 (Item 20) [Fire Water System], page A-79 is revised as follows:

No.	Aging Management Program or Activity (Section)	NUREG-2191 Section	Commitment	Implementation Schedule
			<p>h) Update the governing AMP procedure to point to the inspection procedures which inspect the wall thicknesses and compare to the minimum design thicknesses.</p> <p>i) Update the existing flow test procedure and develop a new main drain test procedure to state that if a flow test or a main drain test does not meet acceptance criteria due to current or projected degradation, then additional tests are conducted. The number of increased tests is determined in accordance with the PBN corrective action program; however, there are no fewer than two additional tests for each test that did not meet acceptance criteria. The additional inspections are completed within the interval (i.e., 5 years, annual) in which the original test was conducted. If subsequent tests do not meet acceptance criteria, an extent of condition and extent of cause analysis is conducted to determine the further extent of tests. Since PBN is a multi-unit site, additional tests include inspections at all of the units with the same material, environment, and aging effect combination.</p> <p><u>[Bullets j and k added by L-2021-081, Attachment 14 (ML21111A155).]</u></p> <p><u>l) Update the primary program documents and procedures and applicable preventive maintenance activities to state that for ongoing degradation mechanisms (e.g., MIC and erosion) or recurring loss of material due to internal corrosion, the frequency and extent of wall thickness inspections are increased commensurate with the significance of the degradation. The number of increased inspections is determined in accordance with the PBN corrective action program; however, no fewer than five additional inspections are conducted for each inspection that did not meet acceptance criteria, or 20% of each applicable material, environment, and aging effect combination is inspected, whichever is less.</u></p>	

SLRA Appendix A, Section 16.4, Table 16-3 (Item 20) [Fire Water System], page A-79 revision continued:

No.	Aging Management Program or Activity (Section)	NUREG-2191 Section	Commitment	Implementation Schedule
			<p><u>Since PBN is a two unit site, the additional inspections include inspections of components with the same material, environment, and aging effect combination at the opposite unit. The additional inspections will occur at least every 24 months until the rate of recurring internal corrosion occurrences no longer meets the criteria for “loss of material due to recurring internal corrosion” as defined in NUREG-2192. The selected inspection locations will be periodically reviewed to validate their relevance and usefulness and adjusted as appropriate. Evaluation of the inspection results will include (1) a comparison to the nominal wall thickness or previous wall thickness measurements to determine rate of corrosion degradation; (2) a comparison to the design minimum allowable wall thickness to determine the acceptability of the component for continued use; and (3) a determination of reinspection interval.</u></p>	

SLRA Section B.2.3.11 [Open-Cycle Cooling Water System], pages B-105 and B-106 are revised as follows:

To assess effectiveness of AMPs credited for subsequent license renewal, the AMPs are reviewed against the criteria provided in NEI 14-12. The most recent effectiveness review of Aging Management Programs at PBN was performed in 2018. The effectiveness review covered the applicable ten program elements with particular attention on the detection of aging effects (element 4), corrective action (element 7), and operating experience (element 10). Full AMP effectiveness reviews are performed at least every five years.

The use of AMP effectiveness self-assessments and the relatively high number of AMP revisions shows that the PBN Open-Cycle Cooling Water System AMP is regularly updated, which is a trait of a healthy AMP.

Quarterly health reports for the service water system are reported. The quarterly service water system health reports from January 2015 through February 2020 were evaluated as part of the SLRA OE review. The service water system health reports are typically green and the general trend for the service water system health report scoring has been positive.

In 2010, 2012 and 2013 the NRC performed the 71003 Phase 1 and 2 inspections for PBN Units 1 and 2. The inspectors verified that the program and program enhancements were in place to ensure: (1) surveillance and control of biofouling; (2) periodic and one-time surveillance testing and inspections to evaluate system and component performance; (3) inspection methods include heat transfer testing, visual testing, ultrasonic testing, and eddy current testing; and (4) routine inspection and Maintenance Program activities to ensure that aging effects do not impair component intended function. The inspectors verified the testing and maintenance activities appropriately implemented the actions. Based on review of the timeliness and adequacy of PBN's actions, the inspectors determined that PBN had met the commitments related to the PBN Open-Cycle Cooling Water System AMP.

In 2019, the NRC performed the 71003 Phase 4 inspections at PBN Units 1 and 2. The PBN Open-Cycle Cooling (Service) Water System Surveillance Program was one of the seven AMPs selected for review. No findings were identified.

~~Although, there are a number of action requests associated with the PBN service water system, the vast majority of these are relatively minor (e.g., wall thickness being below 87.5 percent but above minimum wall thickness, or minor coating repair) and are frequently identified through the service water inservice inspection program. Likewise, opportunistic inspections have been effectively utilized to identify internal wall thinning, fouling, and flow blockage prior to any significant component failure occurring. Finally, PBN has effectively utilized extent of condition evaluations to identify issues in the service water system, and no major service water system piping component failures occurred between 2010 and 2020. Therefore, no enhancements are required with respect to the OE.~~

SLRA Section B.2.3.11 [Open-Cycle Cooling Water System], pages B-105 and B-106 revision continued:

As evaluated above, internal corrosion has occurred within multiple outages during the evaluated 10-year period and several of these occurrences involved a wall reduction of greater than 50 percent. Therefore, the PBN Open-Cycle Cooling Water AMP will manage recurring internal corrosion through the SPEO. With respect to recurring internal corrosion, the PBN Open-Cycle Cooling Water System AMP meets the NUREG-2192 recommendations as follows:

- a) The existing examination methods are sufficient to detect recurring internal corrosion before affecting the ability of a component to perform its intended function. These methods primarily include tangential radiography (RT) and ultrasonic thickness (UT) scanning but can also include visual (VT) inside and guided wave (GW) when appropriate. Performing volumetric examinations in lieu of less thorough visual inspections on the piping areas more susceptible to recurring internal corrosion provides reasonable assurance that inspection results are accurate and that proper corrective actions are performed when needed.
- b) The existing examination procedure manual provides instructions for when to implement augmented inspections. Where pipe wall thinning or cross-sectional blockage reaches 50 percent or greater, then augmented volumetric inspection or further testing is performed to confirm the extent of the overall degradation of the affected system. If such deficiencies are identified, then the number of increased inspections is determined in accordance with the PBN corrective action program; however, no fewer than five additional inspections are conducted for each inspection that did not meet acceptance criteria, or 20 percent of each applicable material, environment, and aging effect combination is inspected, whichever is less. Since PBN is a two unit site, the additional inspections include inspections of components with the same material, environment, and aging effect combination at the opposite unit. The additional inspections will occur at least every 24 months until the rate of recurring internal corrosion occurrences no longer meets the criteria for "loss of material due to recurring internal corrosion" as defined in NUREG-2192. The selected inspection locations will be periodically reviewed to validate their relevance and usefulness and adjusted as appropriate. Evaluation of the inspection results will include (1) a comparison to the nominal wall thickness or previous wall thickness measurements to determine rate of corrosion degradation; (2) a comparison to the design minimum allowable wall thickness to determine the acceptability of the component for continued use; and (3) a determination of reinspection interval. If a failure occurs (e.g., a through-wall leak or blockage impacting operability), the failure mechanism shall be identified and used to determine the most susceptible system locations for additional

SLRA Section B.2.3.11 [Open-Cycle Cooling Water System], pages B-105 and B-106 revision continued:

- inspections, including consideration to the other unit systems as driven by the corrective action program. When piping is replaced prior to failure, due to concerns with wall thinning or blockage, inspections are considered for similar areas of the system to determine the presence and extent of degradation. The implementation of these augmented inspection actions provides reasonable assurance that the service water system will continue to perform its function adequately through the SPEO.
- c) The existing examination procedure manual provides instructions for documenting inspection results, trending corrective actions and deficiencies (e.g., blockage and wall thinning) within a database, and creating annual reports that document ARs, work requests, corrective actions, and future inspection focus areas. The trending of the inspection parameters (wall thinning and blockage) and identifying focus areas (where augmented inspections may be needed) for future inspections provides reasonable assurance that recurring internal corrosion will remain adequately managed through the SPEO.
- d) The review of the OE from 2010 through 2020 did not identify recurring internal corrosion issues specific to the normally inaccessible portions of the service water system (e.g., buried and underground piping). Inspections of components that are not easily accessed are conducted per the same examination procedure manual and surveillance methods and the number of samples are adjusted when necessary. The implementation of the existing examination procedure manual provides reasonable assurance that recurring internal corrosion of the normally inaccessible service water system components will be adequately managed through the SPEO.
- e) The program uses system instrumentation and/or performance monitoring to identify leaks in involved buried or underground components. When leaks are identified, the surveillance methods and the number of samples are adjusted as necessary. Using instrumentation and/or performance monitoring to identify leaks and adjusting inspections to proactively identify leaks on other susceptible piping provides reasonable assurance that recurring internal corrosion of the normally inaccessible service water system components will be adequately managed through the SPEO.

The PBN Open-Cycle Cooling Water OCCW-System AMP is informed and enhanced when necessary through the systematic and ongoing review of both plant-specific and industry OE, including research and development, such that the effectiveness of the AMP is evaluated consistent with the discussion in NUREG-2191, Appendix B.

SLRA Section B.2.3.16 [Fire Water System], page B-131 is revised as follows:

Element Affected	Enhancement
7. Corrective Actions	<p>Update the flow test procedure and develop a new main drain test procedure to state that if a flow test or a main drain test does not meet acceptance criteria due to current or projected degradation, then additional tests are conducted. The number of increased tests is determined in accordance with the PBN corrective action program; however, there are no fewer than two additional tests for each test that did not meet acceptance criteria. The additional inspections are completed within the interval (i.e., 5 years, annual) in which the original test was conducted. If subsequent tests do not meet acceptance criteria, an extent-of-condition and extent-of-cause analysis is conducted to determine the further extent of tests. Since PBN is a multi-unit site, additional tests include inspections at all of the units with the same material, environment, and aging effect combination.</p>
<p><u>7. Corrective Actions</u></p>	<p><u>Update the primary program documents and procedures and applicable preventive maintenance activities to state that for ongoing degradation mechanisms (e.g., MIC and erosion) or recurring loss of material due to internal corrosion, the frequency and extent of wall thickness inspections are increased commensurate with the significance of the degradation. The number of increased inspections is determined in accordance with the PBN corrective action program; however, no fewer than five additional inspections are conducted for each inspection that did not meet acceptance criteria, or 20% of each applicable material, environment, and aging effect combination is inspected, whichever is less. Since PBN is a two-unit site, the additional inspections include inspections of components with the same material, environment, and aging effect combination at the opposite unit. The additional inspections will occur at least every 24 months until the rate of recurring internal corrosion occurrences no longer meets the criteria for “loss of material due to recurring internal corrosion” as defined in NUREG-2192. The selected inspection locations will be periodically reviewed to validate their relevance and usefulness and adjusted as appropriate. Evaluation of the inspection results will include (1) a comparison to the nominal wall thickness or previous wall thickness measurements to determine rate of corrosion degradation; (2) a comparison to the design minimum allowable wall thickness to determine the acceptability of the component for continued use; and (3) a determination of reinspection interval.</u></p>

SLRA Section B.2.3.16 [Fire Water System], page B-133 is revised as follows:

There were several ARs related to the fire protection system and/or the NFPA 805 transition, however most of these were not related to aging/degradation of the fire water system (e.g., administrative, configuration control, electrical, fire barriers).

An effectiveness review of the PBN Fire Protection Program was performed in 2018 following the guidelines in NEI 14-12. The effectiveness review covered the applicable ten program elements with particular attention focused on the detection of aging effects (element 4), corrective action (element 7), and operating experience (element 10). Gaps identified were related to the transition to NFPA 805 licensing basis and not the AMP. The AMP was deemed to be effective.

The quarterly fire protection program health reports from January 2015 through February 2020 were evaluated as part of the SLRA OE review. Although the most recent fire protection program health reports were scored “white,” PBN has an opportunity to achieve a “green” status after entering the monitoring period when all of the NFPA 805 criteria are met.

In 2010 and 2013, the NRC performed the 71003 Phase 2 inspections at PBN Units 1 and 2 respectively. The inspectors verified that new implementing documents were established to implement inspections of selected components and of the fire suppression piping. Based on review of the timeliness and adequacy of PBN’s actions, the inspectors determined that PBN met commitments related to the fire protection AMP.

In 2019, the NRC performed the 71003 Phase 4 inspections at PBN Units 1 and 2. The PBN Fire Protection Program was not one of the seven AMPs selected for review, therefore, no findings were identified.

As evaluated above, internal corrosion has occurred within multiple outages during the evaluated 10-year period and several of these occurrences involved a wall reduction of greater than 50 percent. Therefore, the PBN Fire Water System AMP will manage recurring internal corrosion through the SPEO. With respect to recurring internal corrosion, the PBN Fire Water System AMP meets the NUREG-2192 recommendations as follows:

- a) The existing examination methods are sufficient to detect recurring internal corrosion before affecting the ability of a component to perform its intended function. These methods primarily include tangential radiography (RT) and ultrasonic thickness (UT) scanning but can also include visual (VT) inside and guided wave (GW) when appropriate. Performing volumetric examinations in lieu of less thorough visual inspections on the piping areas more susceptible to recurring internal corrosion provides reasonable assurance that inspection results are accurate and that proper corrective actions are performed when needed.**

SLRA Section B.2.3.16 [Fire Water System], page B-133 revision continued:

- b) The existing examination procedure manual provides instructions for when to implement augmented inspections. Where pipe wall thinning or cross-sectional blockage reaches 50 percent or greater, then augmented volumetric inspection or further testing is performed to confirm the extent of the overall degradation of the affected system. If such deficiencies are identified, then the number of increased inspections is determined in accordance with the PBN corrective action program; however, no fewer than five additional inspections are conducted for each inspection that did not meet acceptance criteria, or 20 percent of each applicable material, environment, and aging effect combination is inspected, whichever is less. Since PBN is a two unit site, the additional inspections include inspections of components with the same material, environment, and aging effect combination at the opposite unit. The additional inspections will occur at least every 24 months until the rate of recurring internal corrosion occurrences no longer meets the criteria for “loss of material due to recurring internal corrosion” as defined in NUREG-2192. The selected inspection locations will be periodically reviewed to validate their relevance and usefulness and adjusted as appropriate. Evaluation of the inspection results will include (1) a comparison to the nominal wall thickness or previous wall thickness measurements to determine rate of corrosion degradation; (2) a comparison to the design minimum allowable wall thickness to determine the acceptability of the component for continued use; and (3) a determination of reinspection interval. If a failure occurs (e.g., a through-wall leak or blockage impacting operability), the failure mechanism shall be identified and used to determine the most susceptible system locations for additional inspections, including consideration to the other unit systems as driven by the corrective action program. When piping is replaced prior to failure, due to concerns with wall thinning or blockage, inspections are considered for similar areas of the system to determine the presence and extent of degradation. The implementation of these augmented inspection actions provides reasonable assurance that the fire water system will continue to perform its function adequately through the SPEO.
- c) The existing examination procedure manual provides instructions for documenting inspection results, trending corrective actions and deficiencies (e.g., blockage and wall thinning) within a database, and creating annual reports that document ARs, work requests, corrective actions, and future inspection focus areas. The trending of the inspection parameters (wall thinning and blockage) and identifying focus areas (where augmented inspections may be needed) for future inspections provides reasonable assurance that recurring internal corrosion will remain adequately managed through the SPEO.

SLRA Section B.2.3.16 [Fire Water System], page B-133 revision continued:

- d) The review of the OE from 2010 through 2020 did not identify recurring internal corrosion issues specific to the normally inaccessible portions of the fire water system (e.g., buried and underground piping). Inspections of components that are not easily accessed are conducted per the same examination procedure manual and surveillance methods and the number of samples are adjusted when necessary. The implementation of the existing examination procedure manual provides reasonable assurance that recurring internal corrosion of the normally inaccessible fire water system components will be adequately managed through the SPEO.**
- e) The program uses system instrumentation and/or performance monitoring to identify leaks in involved buried or underground components. When leaks are identified, the surveillance methods and the number of samples are adjusted as necessary. Using instrumentation and/or performance monitoring to identify leaks and adjusting inspections to proactively identify leaks on other susceptible piping provides reasonable assurance that recurring internal corrosion of the normally inaccessible fire water system components will be adequately managed through the SPEO.**

OE will be reviewed such that if there is an indication that the effects of aging are not being adequately managed, a corrective action will be initiated to either enhance the AMP or implement new AMPs, as appropriate. In addition, AMP effectiveness will be assessed at least every five years per NEI 14-12.

The PBN Fire Water System AMP is informed and enhanced when necessary through the systematic and ongoing review of both plant-specific and industry OE, including research and development, such that the effectiveness of the AMP is evaluated consistent with the discussion in NUREG-2191, Appendix B.

Conclusion

The PBN Fire Water System AMP, with enhancements, will provide reasonable assurance that the effects of aging will be adequately managed so that the intended function(s) of components within the scope of the AMP will be maintained consistent with the CLB during the SPEO.

SLRA Section B.2.3.25 [Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components], page B-184 is revised as follows:

Inspections not conducted in accordance with ASME Code Section XI requirements are conducted in accordance with plant-specific procedures including inspection parameters such as lighting, distance, offset and surface conditions. Acceptance criteria are such that the component will meet its intended function until the next inspection or the end of the SPEO. Qualitative acceptance criteria are clear enough to reasonably assure a singular decision is derived based on observed conditions. Corrective actions are performed as required based on the inspections results.

This AMP is also used to manage cracking due to stress corrosion cracking (SCC) in aluminum and stainless steel (SS) components exposed to aqueous solutions and air environments containing halides. This AMP is not used to manage components where visual inspection of internal surfaces is not possible unless specific volumetric inspections are performed as noted above.

This AMP ~~does not~~will to manage carbon steel components exposed to Lake Michigan raw water in which potential recurring internal corrosion may become evident~~is a known issue~~. If operating experience indicates that there has been recurring internal corrosion, ~~a plantspecific AMP will be necessary unless this AMP, or another new or existing AMP, includes augmented requirements that address~~ recurring aging effects (e.g., Standard Review Plan for Review of Subsequent License Renewal Applications for Nuclear Power Plants (SRP-SLR) Sections 3.2.2.2.7, 3.3.2.2.7, and 3.4.2.2.6) will be implemented by this AMP. ~~Following failure due to recurring internal corrosion, this AMP may be used if the failed material is replaced by one that is more corrosion resistant in the environment of interest, or corrective actions have been taken to prevent recurrence of the recurring internal corrosion.~~

SLRA Section B.2.3.25 [Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components], page B-188 is revised as follows:

- December 2017: A service water vent plug (carbon steel in raw water) was leaking and found to have experienced approximately 50 percent material loss. Both the associated valve and plug were replaced. An aging management review performed resulted in recommending additional replacements to proactively manage this issue. As a result, two similar fittings were replaced on the service water supply piping.
- October 2018: Eddy current testing (ECT) of the Unit 2 containment fan cooler tubes discovered that 7 U-tubes needed to be plugged. The tube degradation was from internal corrosion. ECT readings were validated and reports reviewed by fleet engineers for concurrence. Recommendations were made to plug tubes approaching 35 percent wear and adjust the inspection preventive maintenance activities to account for this change in condition. The tubes were subsequently plugged in accordance with the above recommendations and preventive maintenance activities revised to include inspection of these plugs.

The review of plant-specific OE for fire water and service water systems indicates the potential for recurring internal corrosion in carbon steel components exposed to Lake Michigan raw water. Actions will be incorporated into the PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP to address the augmented aging management activities identified in Section 3.3.2.2.7 of NUREG-2192. Therefore, the PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP will manage recurring internal corrosion through the SPEO. With respect to recurring internal corrosion, the PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP meets the NUREG-2192 recommendations as follows:

- a) **The examination methods will be sufficient to detect recurring internal corrosion before affecting the ability of a component to perform its intended function. These methods will primarily include tangential radiography (RT) and ultrasonic thickness (UT) scanning but can also include visual (VT) inside and guided wave (GW) when appropriate. Performing volumetric examinations in lieu of less thorough visual inspections on the piping areas more susceptible to recurring internal corrosion will provide reasonable assurance that inspection results are accurate and that proper corrective actions will be performed when needed.**

SLRA Section B.2.3.25 [Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components], page B-188 revision continued:

- b) The examination procedures will provide instructions for when to implement augmented inspections. Where pipe wall thinning or cross-sectional blockage reaches 50 percent or greater, then augmented volumetric inspection or further testing will be performed to confirm the extent of the overall degradation of the affected system. If such deficiencies are identified, then the number of increased inspections will be determined in accordance with the PBN corrective action program; however, no fewer than five additional inspections are conducted for each inspection that did not meet acceptance criteria, or 20 percent of each applicable material, environment, and aging effect combination is inspected, whichever is less. Since PBN is a two unit site, the additional inspections include inspections of components with the same material, environment, and aging effect combination at the opposite unit. The additional inspections will occur at least every 24 months until the rate of recurring internal corrosion occurrences no longer meets the criteria for “loss of material due to recurring internal corrosion” as defined in NUREG-2192. The selected inspection locations will be periodically reviewed to validate their relevance and usefulness and adjusted as appropriate. Evaluation of the inspection results will include (1) a comparison to the nominal wall thickness or previous wall thickness measurements to determine rate of corrosion degradation; (2) a comparison to the design minimum allowable wall thickness to determine the acceptability of the component for continued use; and (3) a determination of reinspection interval. If a failure occurs (e.g., a through-wall leak or blockage impacting operability), the failure mechanism will be identified and used to determine the most susceptible system locations for additional inspections, including consideration to the other unit systems as driven by the corrective action program. When piping is replaced prior to failure, due to concerns with wall thinning or blockage, inspections will be considered for similar areas of the system to determine the presence and extent of degradation. The implementation of these augmented inspection actions will provide reasonable assurance that components will continue to perform their functions adequately through the SPEO.
- c) The examination procedures will provide instructions for documenting inspection results, trending corrective actions and deficiencies (e.g., blockage and wall thinning) within a database, and creating annual reports that document ARs, work requests, corrective actions, and future inspection focus areas. The trending of the inspection parameters (wall thinning and blockage) and identifying focus areas (where augmented inspections may be needed) for future inspections will provide reasonable assurance that recurring internal corrosion will remain adequately managed through the SPEO.

SLRA Section B.2.3.25 [Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components], page B-188 revision continued:

- d) The review of the OE from 2010 through 2020 did not identify recurring internal corrosion issues specific to the normally inaccessible portions of the systems within the scope of the PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP (e.g., buried and underground piping). Inspections of components that are not easily accessed will be conducted per the same examination procedures and surveillance methods and the number of samples will be adjusted when necessary. The implementation of the examination procedures will provide reasonable assurance that recurring internal corrosion of the normally inaccessible components will be adequately managed through the SPEO.
- e) The program uses system instrumentation and/or performance monitoring to identify leaks in involved buried or underground components. When leaks are identified, the surveillance methods and the number of samples will be adjusted as necessary. Using instrumentation and/or performance monitoring to identify leaks and adjusting inspections to proactively identify leaks on other susceptible piping will provide reasonable assurance that recurring internal corrosion of the normally inaccessible components within the scope of the PBN Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components AMP will be adequately managed through the SPEO.

OE will be reviewed such that if there is an indication that the effects of aging are not being adequately managed, a corrective action will be initiated to either enhance the AMP or implement new, as appropriate. In addition, AMP effectiveness will be assessed at least every five years per NEI 14-12.