Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

January 18, 2012
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Response to Requests for Additional Information for the
South Texas Project License Renewal Application
Aging Management Program, Set 10 (TAC Nos. ME4936 and ME4937)

References:
1. STPNOC letter dated October 25, 2010, from G. T. Powell to NRC Document Control Desk, "License Renewal Application" (NOC-AE-10002607) (ML103010257)
2. NRC letter dated December 14, 2011, "Requests for Additional Information for the Review of the South Texas Project, Units 1 and 2 License Renewal Application – Aging Management, Set 10 (TAC Nos. ME4936 and ME 4937)"(ML11332A100)
3. STPNOC letter dated December 15, 2011, from D. W. Rencurrel to NRC Document Control Desk, "Response to Requests for Additional Information for the South Texas Project License Renewal Application Aging Management Program, Set 8 (TAC Nos. ME4936 and ME 4937)" (NOC-AE-11002764) (ML11362A080)

By Reference 1, STP Nuclear Operating Company (STPNOC) submitted a License Renewal Application (LRA) for South Texas Project (STP) Units 1 and 2. By Reference 2, the NRC staff requests additional information for review of the STP LRA. STPNOC's response to the request for additional information is provided in Enclosure 1 to this letter. In addition, this letter completes a response to RAI B2.1.3-2a that was not provided in Reference 3. Changes to LRA pages described in Enclosure 1 are depicted in line-in/line-out pages provided in Enclosure 2.

There are no regulatory commitments provided in this letter.

Should you have any questions regarding this letter, please contact either Arden Aldridge, STP License Renewal Project Lead, at (361) 972-8243 or Ken Taplett, STP License Renewal Project regulatory point-of-contact, at (361) 972-8416.

A147
NRR

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

Executed on 1/18/2012
Date

D. W. Rencurrel
Senior Vice President,
Technical Support & Oversight

KJT
Enclosure: 1. STPNOC Response to Requests for Additional Information
2. STPNOC LRA Changes with Line-in/Line-out Annotations

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Enclosure 1

STPNOC Response to Requests for Additional Information

STPNOC Response to Requests for Additional Information

SOUTH TEXAS PROJECT, UNITS 1 AND 2
REQUEST FOR ADDITIONAL INFORMATION -
AGING MANAGEMENT, SET 10
(TAC NOS. ME4936 AND ME4937)

STP One-Time Inspection of ASME Code Class 1 Small-Bore Piping (036)

RAI B2.1.19-3

Background:

The applicant submitted its license renewal application (LRA), which included Appendix A1.19 and Appendix B2.1.19, on October 25, 2010. The applicant amended the LRA, along with Appendix A1.19 and Appendix B2.1.19, by letter dated June 16, 2011.

The staff issued request for additional information (RAI) B2.1.19-1 in a letter dated August 15, 2011, requesting the applicant to provide information on weld population and inspection sample size, and to update its UFSAR supplement accordingly.

In its response to RAI B2.1.19-1 dated Sept 15, 2011, the applicant stated that LRA Appendix A1.19 and Appendix B2.1.19 would be revised to include the weld population and inspection sample size. However, the applicant did not revise LRA Appendix B2.1.19 or the UFSAR Supplement in LRA Section A1.19.

By letter dated October 18, 2011, the staff issued RAI B2.1.19-2 requesting that the applicant revise Appendix A1.19 and Appendix B2.1.19 to include the weld population and inspection sample size information and to update its UFSAR supplement accordingly.

In its responses dated November 4 and 17, 2011, to RAI B2.1.19-2, the applicant provided the revised LRA Appendix A1.19 and Appendix B2.1.19.

Issue:

The latest amendments to LRA Appendix A1.19 and Appendix B2.1.19 provided by the applicant contain an exception which was previously deleted in a June 16, 2011, amendment. They also contain NUREG-1801 consistency discussion and program conclusion which were in the original LRA but were also removed in the June 16, 2011, amendment. The staff needs clarification regarding why the applicant's latest amendments did not include previous changes provided in its June 16, 2011, submittal.

Request:

Revise LRA Appendix A1.19 and Appendix B2.1.19 appropriately to reflect the latest changes, or provide technical basis to justify why previous changes were removed.

STPNOC Response:

The standard method used to identifying changes to the LRA is by underlining additions and using strikethrough for deletions. The Appendix B2.1.19 pages submitted by letter dated June 16, 2011 (ML11172A096) only provided the sections of the appendix that were changed and not the complete Appendix B2.1.19. The NUREG-1801 Consistency section, Exception to NUREG-1801 section, Enhancement section, and the Conclusion section were not provided because no changes were made to these sections. The Exception to NUREG-1801 section, the NUREG-1801 consistency discussion and program conclusion were not shown using strikethrough and therefore were not deleted as suggested in RAI B2.1.19-3.

After submittal of the June 16, 2011 letter, it was recognized that the complete appendix should be submitted to aid the review. Therefore, the Appendix B2.1.19 pages submitted by letters dated November 4, 2011 (ML11319A026) and November 17, 2011 (ML11333A093) were submitted as a complete appendix with the additions underlined and the deletions strikethrough. The most recent revision to LRA Appendix A1.19 and Appendix B2.1.19 is provided in the November 17, 2011 letter.

Boric Acid Corrosion - (010)

RAI 3.3.1.88-2

Background:

By letter dated September 22, 2011, the staff issued RAI 3.3.1.88-1, requesting the applicant to state why aluminum insulation in LRA Table 3.3.2-19 was not managed for loss of material due to boric acid corrosion.

In its response dated October 25, 2011, the applicant stated that the aging management evaluation for a treated borated water leakage environment is considered applicable only for components that contain treated borated water, and is not applicable for adjacent system components or insulation on the piping that contains the treated borated water. The applicant also stated that it is possible that the aluminum sheathing could be exposed to borated water leakage. The applicant further stated that boric acid corrosion caused by treated borated water leakage from the system onto the aluminum sheathing is managed by the Boric Acid Corrosion Program.

GALL Report, Revision 2, AMP XI.M10, "Boric Acid Corrosion Program," "scope of program" program element states that the program covers any structures or components on which boric acid corrosion may occur. The AMP XI.M10 program description also states that the scope of the evaluations, assessments, and corrective actions include all observed leakage sources and the affected structures and components. The GALL Report includes several items to manage boric acid corrosion for components that are adjacent to piping that contains treated borated water. These include, but are not limited to, item VII.E1.A-79 (steel external surfaces), VII.E1.AP-1 (aluminum piping), and VII.I.AP-66 (copper alloy >15% Zn or >8% Al piping).

SRP-LR, Revision 2, Section A.1.2.1 states "[a]lthough bolted connections are not supposed to leak, experience shows that leaks do occur, and the leakage could cause corrosion. Thus, the aging effects from leakage of bolted connections should be evaluated for license renewal."

Issue:

1. Given that the applicant stated that it is possible that the aluminum sheathing could be exposed to borated water leakage, it is not clear to the staff why the appropriate AMR item for a borated water leakage environment does not appear in LRA Table 3.3.2-19.

2. Based on a review of the AMR Table 2s and general knowledge of the layout of PWR systems, the staff considers it possible that there are other in-scope systems that have components that are adjacent to piping that contains borated water and, therefore, are potentially exposed to borated water leakage. If this is the case, each applicable Table 2 should have AMR item(s) that reflect the aging management of these components in the borated water leakage environment.

Request:

1. Include an AMR item for the aluminum sheathing exposed to air with borated water leakage in LRA Table 3.3.2-19.

2. Include AMR item(s) in all applicable AMR Table 2s for a borated water leakage environment for all in-scope, susceptible components that are adjacent to locations in borated water piping where leakage is most likely to occur (e.g., bolted joints, gasket and flanged connections).

STPNOC Response:

1. LRA Table 3.3.2-19 is revised to add an aging management review (AMR) line for insulation aluminum jacketing with an external environment of borated water leakage. Aluminum jacketing is also used to cover insulation in the main steam, feedwater and steam generator blowdown systems. These systems are in the vicinity of other plant components that have internal environments of treated borated water. As a result, LRA Tables 3.4.2-1, 3.4.2-3 and 3.4.2-5 are revised to include AMR lines for insulation aluminum jacketing with an external environment of borated water leakage.

2. A review of plant systems in the reactor containment building, fuel handling building and mechanical electrical auxiliary building identified the following systems that contain components within the scope of license renewal that are potentially in the vicinity of components containing treated borated water. The systems are:

   - Reactor coolant system - LRA Table 3.1.2-2
   - Integrated leak rate test system - LRA Table 3.2.2-2
   - Residual heat removal system - LRA Table 3.2.2-3
   - Safety injection system - LRA Table 3.2.2-4
   - Spent fuel pool cooling and cleanup system - LRA Table 3.3.2-2
   - Essential cooling water (ECW) and ECW screen wash system - LRA Table 3.3.2-4
   - Component cooling water system - LRA Table 3.3.2-6

- Compressed air systems - LRA Table 3.3.2-7
- Primary process sampling system - LRA Table 3.3.2-8
- Chilled water HVAC system - LRA Table 3.3.2-9
- Fire protection system - LRA Table 3.3.2-17
- Chemical and volume control system - LRA Table 3.3.2-19
- Liquid waste processing system - LRA Table 3.3.2-22
- Radioactive vents & drains system - LRA Table 3.3.2-23
- Nonradioactive waste plumbing drains and sumps system - LRA Table 3.3.2-24
- Oily waste system - LRA Table 3.3.2-25
- Radiation monitoring (area & process) mechanical system - LRA Table 3.3.2-26
- Boron recycling system - LRA Table 3.3.2-27
- Condensate system - LRA Table 3.3.2-27
- Essential cooling pond makeup system - LRA Table 3.3.2-27
- Low pressure nitrogen system - LRA Table 3.3.2-27
- MAB plant vent header system (radioactive) - LRA Table 3.3.2-27
- Open loop auxiliary cooling system - LRA Table 3.3.2-27
- Potable water and well water system - LRA Table 3.3.2-27
- Turbine vents and drains system - LRA Table 3.3.2-27
- Main steam system - LRA Table 3.4.2-1
- Auxiliary steam system and boilers - LRA Table 3.4.2-2
- Feedwater system - LRA Table 3.4.2-3
- Demineralizer water (make-up) system - LRA Table 3.4.2-4
- Steam generator blowdown system - LRA Table 3.4.2-5

Generic components named "Piping, Piping Components and Piping Elements" (component type "Piping") are added for each susceptible material in the system (i.e., aluminum, steel, galvanized steel and copper >15% zinc) with an external environment of borated water leakage. "Closure Bolting" components are added for steel bolting with an external environment of borated water leakage. Additional components are added to address "Tanks" and "Heat Exchangers" and other components, as appropriate, with an external environment of borated water leakage.

The LRA Tables listed above are revised to include AMR lines to address the aging management of the added components with an external environment of borated water leakage. In addition, Tables 3.3.1 and 3.4.1 and the Section 3 description of each system impacted by this change are revised.

Enclosure 2 provides the line-in/line-out revision to LRA Sections and Tables.

RAI 4.7.3-2 (066)

Background:

In a letter dated September 21, 2011, the staff issued RAI 4.7.3-1, requesting that the applicant state how visual inspections in the Open-Cycle Cooling Water System program are capable of ensuring that corrosion in the essential cooling water (ECW) system will not exceed the 40-mil corrosion allowance, given that LRA Section 4.7.3 documented the use of this program as the disposition for the related TLAA.

In its response dated November 21, 2011, the applicant stated that ECW corrosion is managed consistent with NRC Generic Letter 89-13. The applicant also stated that, when visual inspections identify corrosion, thickness measurements are taken as part of the corrective action program.

Issue:

The staff lacks sufficient information to conclude that visual inspections alone will be capable of prompting follow-up thickness measurements such that the 40-mil corrosion allowance will not be exceeded during the period of extended operation. The staff believes that visual examinations may need to be augmented with physical measurements, using tools such as inside calipers, to ensure that corrosion is not approaching the limit. Given that physical measurements may be required to augment the visual inspections, the staff requires further details on how the program will manage this TLAA, such as how often physical measurements will be conducted, how many locations will be checked, how the most susceptible location will be selected, what devices will be used, and the criteria that would result in a follow-up volumetric examination.

Request:

1. State how visual inspections of the ECW system, without augmented physical measurements, will be capable of detecting a 40-mil loss of material.

2. Alternatively, state what augmented inspection techniques will be used to detect loss of material. Include information such as how often physical measurements will be conducted, how many locations will be checked, how the most susceptible location will be selected, what devices will be used, and the criteria that would result in a follow-up volumetric examination in sufficient detail such that the staff can independently conclude that the inspection methodologies will adequately manage loss of material for this TLAA.

STPNOC Response:

Response to be provided by January 31, 2012

RAI B2.1.3-2a (Reference: ML11362A080)

Background:

By letter dated August 15, 2011, the staff issued RAI B2.1.3-2, requesting that the applicant provide additional information regarding the applicant's engineering evaluation and continued use of the partially damaged stud insert of Unit 2 (April 2007), inspections of the reactor vessel head closure bolting components, and related operating experience such as leakage events.

Issue:

By letter dated September 15, 2011, the applicant responded to RAI B2.1.3-2. In its response, the applicant did not provide information regarding inspections conducted to monitor any additional adverse change in the load bearing areas of the partially damaged stud insert. The staff finds that this information is needed for the staff's evaluation to confirm that neither additional reduction nor flaw initiation in the load bearing areas has occurred beyond the original damage. The applicant's site documentation conservatively estimates the original damage (rolling) of the stud insert as 5.14 in^2, which is 17% of the total load bearing surfaces of the stud insert lugs.

In its review of the applicant's response and related information, the staff noted that applicant's updated final safety analysis report Table 5.2-1, "Applicable Code Addenda for RCS Components," indicates that the reactor vessel head of STP, Unit 2, is constructed in accordance with the 1971 edition through the Summer of 1973 addenda of American Society of Mechanical Engineers (ASME) Code, Section III. The staff also noted that NB-3232.2, NB-3233, and NB-3234 of the 1971 edition of ASME Code, Section III, specifies the requirements for the maximum stress for bolts in normal, upset and emergency conditions, respectively. These provisions of the ASME Code require that the maximum value of the service stress at the periphery of the bolt-cross section shall not exceed the three times the stress values of ASME Code Section III, Appendix I, Table 1-1.3 (that is, not to exceed the three times design stress intensity values, S_m, for bolting materials for Class 1 components).

The staff finds that the reduced load bearing surfaces of the partially damaged (rolled) stud insert increase the stress level applied to the lugs of the stud insert such that loss of material due to wear and cracking due to SCC may be facilitated. In contrast with these adverse effects on aging, the applicant's response to RAI B2.1.3-2 does not indicate whether or not the partially damaged stud insert complies with the aforementioned requirements of the ASME Code Section III for the maximum service stress limit.

Request:

1. Clarify:

    a. Whether or not inspections have been conducted to monitor any additional adverse change in the load bearing areas of the damaged stud insert since the partially damaged stud insert was placed in service after the applicant's engineering evaluation.

b. If subsequent inspections have been performed, provide the results of the inspections to confirm that neither additional reduction nor flaw initiation in the load bearing areas has occurred beyond the original damage addressed above.

2. If the applicant has not conducted a subsequent inspection of the partially damaged stud insert, provide information regarding the schedule and examination methods for the subsequent inspection to be conducted.

3. Describe the applicant's operating experience to clarify whether or not any other stud or stud insert has experienced damage similar to that of the partially rolled stud insert.

4. In view of the adverse effects of the damaged stud insert on aging due to the increased stress levels,

   a. Provide information to confirm whether or not the partially damaged stud insert complies with the aforementioned requirements of ASME Code Section III, NB 3232.2, NB-3233, and NB-3234 for the maximum service stress limit in the normal, upset and emergence conditions.

   b. As part of the response, describe the location of the maximum service stress.

   c. In addition, provide information to clarify whether or not the maximum service stress of the damaged stud insert in faulted conditions does not exceed the three times the stress values of ASME Code Section III, Appendix I, Table I-1.3 in a consistent manner with the aforementioned ASME Code requirements.

Alternatively, justify why the maximum stress of the damaged stud insert in the faulted conditions are acceptable to adequately maintain the intended function of the reactor head closure bolting components.

STPNOC Response:

1. (Response previously provided) The required 10-year ASME Section XI inspection of all reactor closure head bolting materials was performed during the Unit 2 Fall 2008 refueling outage (2RE13). The stud hole inserts were ultrasonically inspected, as allowed by relief request RR-ENG-2-5 (approved by NRC correspondence dated June 17, 1999). The UT inspection did not identify any flaws in stud hole insert #30. Because this was a UT inspection, there was no information regarding whether the bearing surface of the insert had been reduced beyond the original damage.

2. (Response previously provided) LRA Appendix B2.1.3, LRA Table A4-1 and LRA Basis Document XI.M3 (B2.1.3), Reactor Head Closure Studs program, are revised to perform a remote VT-1 of stud insert #30 concurrent with the volumetric examination once every 10 years to verify no additional loss of bearing surface area has occurred.

3. (Response previously provided) No other stud or stud hole insert has experienced damage similar to that of insert #30.

4. (Response was not previously provided)

   a. The Rotolok Mechanism which includes the Stud Hole Insert, Stud, and Top Closure Head are designed under all conditions to meet the requirements of the applicable sections of ASME Boiler and Pressure Vessel Code, Section III of the 1971 edition with addenda through the summer of 1973.

      Because it is a stud hole insert, the maximum stud service stress and average stud service stress of Section NB-3230 are not directly applicable since this is not a stud or bolt that is under tensile loading at all times. The stud hole insert loading is more complex with bearing shear loading on the lugs. Therefore, the ASME Section III analysis methodology for other than bolts is applied for the stud hole inserts. A comprehensive thermal/stress analysis for normal and upset conditions using a 3-D finite element model was performed and documented in the Addendum to the Combustion Engineering (CE) Stress Report, dated October 1986. The maximum stress intensity range is 98.85 ksi with the ASME Code Section III allowable of 120 ksi.

   b. The maximum range of stress intensity compared to the $3S_m$ (i.e., 3 times the maximum stress) allowable and the maximum fatigue usage factor of 0.8852 is on stud insert lug number 6. Due to the nature of the bearing deformation damage, the results are not considered to change as the critical cuts and loading are not changed. The bearing stress on the non-deformed surfaces of the insert lugs was determined to be limiting consideration.

   c. This RAI subsection focuses on faulted conditions. However, the maximum service stress limit of three times the stress values of ASME Code Section III, Appendix I, Table 1-1.3 is for normal and upset conditions, not faulted conditions. The $3S_m$ limit is met for insert lug number 6 with a reported maximum stress intensity range of 98.85 ksi compared to $3S_m$ of 120.0 ksi identified in Table 11-16 of the Addendum to the CE Stress Report, dated October 1986. However, the maximum faulted condition stress for Rotolok stud system for the primary stress resulting from the maximum faulted condition transient (control rod ejection) is reported as 78.70 ksi on Page A-192 of the CE Stress Report for South Texas Project Unit 1, dated October 1977 where it is compared to $3.6S_m$ of 131.7 ksi. This limit for faulted conditions comes from ASME Section III Appendix F.

Enclosure 2

STPNOC LRA Changes with Line-in/Line-out Annotations

List of Revised LRA Sections

RAI	Affected LRA Section
RAI 3.3.1.88-2	• Table 3.1.2-2 • Section 3.2.2.1.2 • Section 3.2.2.1.3 • Table 3.2.2-2 • Table 3.2.2-3 • Table 3.2.2-4 • Section 3.3.2.1.2 • Section 3.3.2.1.4 • Section 3.3.2.1.6 • Section 3.3.2..1.7 • Section 3.3.2.1.8 • Section 3.3.2.1.9 • Section 3.3.2.1.17 • Section 3.3.2.1.19 • Section 3.3.2.1.23 • Section 3.3.2.1.24 • Section 3.3.2.1.25 • Section 3.3.2.1.26 • Section 3.3.2.1.27 • Table 3.3.1 • Table 3.3.2-2 • Table 3.3.2-4 • Table 3.3.2-6 • Table 3.3.2-7 • Table 3.3.2-8 • Table 3.3.2-9 • Table 3.3.2-17 • Table 3.3.2-19 • Table 3.3.2-22 • Table 3.3.2-23 • Table 3.3.2-24 • Table 3.3.2-25 • Table 3.3.2-26 • Table 3.3.2-27 • Section 3.4.2.1.1 • Section 3.4.2.1.2

	• Section 3.4.2.1.3 • Section 3.4.2.1.4 • Section 3.4.2.1.5 • Table 3.4.1 • Table 3.4.2-1 • Table 3.4.2-2 • Table 3.4.2-3 • Table 3.4.2-4 • Table 3.4.2-5

Table 3.1.2-2 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Coolant System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.C2-8	3.1.1.52	B
Closure Bolting	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A
Closure Bolting	PB	Stainless Steel	Borated Water Leakage (Ext)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	IV.C2-10	3.1.1.07	A
Closure Bolting	PB	Stainless Steel	Borated Water Leakage (Ext)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	IV.C2-10	3.1.1.07	A
Flame Arrestor	PB	Aluminum	Borated Water Leakage	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Flame Arrestor	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.33) and One-Time Inspection (B2.1.16)	VII.G-26	3.3.1.15	D,3
Insulation	INS	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	C
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.D1-1	3.2.1.45	A
Piping	LBS	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-26	3.3.1.15	B

Table 3.1.2-2 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Coolant System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	B
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	B
Piping	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	IV.E-3	3.1.1.86	A
Rupture Disc	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-31	3.2.1.48	E, 2
Splash Guard	DF	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.D1-1	3.2.1.45	A
Splash Guard	DF	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	D, 3
Splash Guard	DF	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	D,3
Tank	LBS, SIA, PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.D1-1	3.2.1.45	A
Tank	LBS, SIA	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-22	3.3.1.14	D

3.2.2.1.2 Integrated Leak Rate Test System

Materials

The materials of construction for the integrated leak rate test system component types are:

- Carbon Steel

Environment

The integrated leak rate test system components are exposed to the following environments:

- Borated Water Leakage
- Plant Indoor Air

Aging Effects Requiring Management

The following integrated leak rate test system aging effects require management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the integrated leak rate test system component types:

- Boric Acid Corrosion (B2.1.4)
- Bolting Integrity (B2.1.7)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces In Miscellaneous Piping And Ducting Components (B2.1.22)

3.2.2.1.3 Residual Heat Removal System

Materials

The materials of construction for the residual heat removal system component types is:

- Carbon Steel
- Insulation Fiberglass
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The residual heat removal system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Plant Indoor Air
- Reactor Coolant
- Treated Borated Water

Aging Effects Requiring Management

The following residual heat removal system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the aging effects for the residual heat removal system component types:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)
- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

Table 3.2.2-2 Engineered Safety Features – Summary of Aging Management Evaluation – Integrated Leak Rate Test System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Blank Flange	PB	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-19	3.2.1.32	B
Closure Bolting	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-2	3.2.1.45	A
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Piping	PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-9	3.2.1.45	A
Piping	PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	B
Piping	PB, SIA	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	V.A-19	3.2.1.32	B

Notes for Table 3.2.2-2:

Standard Notes:

A	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
B	Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG-1801 AMP.

Plant Specific Notes:

None

Table 3.2.2-3 Engineered Safety Features – Summary of Aging Management Evaluation – Residual Heat Removal System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB, LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-2	3.2.1.45	A
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Flow Element	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-31	3.2.1.48	E, 2
Heat Exchanger (Residual Heat Removal)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-9	3.2.1.45	A
Heat Exchanger (Residual Heat Removal)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-6	3.2.1.27	B
Heat Exchanger (Residual Heat Removal)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-31	3.2.1.48	E, 2
Heat Exchanger (RHR Pump Seal Water Cooler)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-9	3.2.1.45	A
Heat Exchanger (RHR Pump Seal Water Cooler)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-6	3.2.1.27	B

Table 3.2.2-4 Engineered Safety Features – Summary of Aging Management Evaluation – Safety Injection System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.D1-30	3.2.1.49	E, 1
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-2	3.2.1.45	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	B
Piping	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.E-9	3.2.1.45	A
Piping	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	V.F-13	3.2.1.57	A

3.3.2.1.2 Spent Fuel Pool Cooling and Cleanup System

Materials

The materials of construction for the spent fuel pool cooling and cleanup system component types are:

- Carbon Steel
- Stainless Steel

Environment

The spent fuel pool cooling and cleanup system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Plant Indoor Air
- Treated Borated Water

Aging Effects Requiring Management

The following spent fuel pool cooling and cleanup system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Reduction of heat transfer
- Wall Thinning

Aging Management Programs

The following aging management programs manage the aging effects for the spent fuel pool cooling and cleanup system component types:

- Flow-Accelerated Corrosion (B2.1.6)
- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.3.2.1.4 Essential Cooling Water and ECW Screen Wash System

Materials

The materials of construction for the essential cooling water and ECW screen wash system component types are:

- Aluminum
- Carbon Steel
- Carbon Steel clad with Copper-Nickel
- Copper Alloy
- Copper Alloy (Aluminum > 8 percent)
- Ductile Iron
- Nickel-Alloys
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The essential cooling water and ECW screen wash system components are exposed to the following environments:

- Borated Water Leakage
- Buried
- Plant Indoor Air
- Raw Water

Aging Effects Requiring Management

The following essential cooling water and ECW screen wash system aging effects require management:

- Loss of material
- Loss of preload
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the aging effects for the essential cooling water and ECW screen wash system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Buried Piping and Tanks Inspection (B2.1.18)

- External Surfaces Monitoring Program (B2.1.20)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Aluminum Bronze (B2.1.37)

3.3.2.1.6 Component Cooling Water System

Materials

The materials of construction for the component cooling water system component types are:

- Carbon Steel
- Copper Alloy
- Copper Alloy (>15% Zinc)
- Glass
- Stainless Steel
- Titanium

Environment

The component cooling water system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Demineralized Water
- Dry Gas
- Lubricating Oil
- Plant Indoor Air
- Raw Water
- Treated Borated Water

Aging Effects Requiring Management

The following component cooling water system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the aging effects for the component cooling water system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)

- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

3.3.2.1.7 Compressed Air System

Materials

The materials of construction for the compressed air system component types are:

- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Copper Alloy (> 15 percent Zinc)
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The compressed air system component types are exposed to the following environments:

- Borated Water Leakage
- Closed Cycle Cooling Water
- Lubricating Oil
- Plant Indoor Air

Aging Effects Requiring Management

The following compressed air system aging effects require management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the compressed air system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- Selective Leaching of Materials (B2.1.17)

3.3.2.1.8 Primary Process Sampling System

Materials

The materials of construction for the primary process sampling system component types are:

- Carbon Steel
- Stainless Steel

Environment

The primary process sampling system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Demineralized Water
- Plant Indoor Air
- Treated Borated Water

Aging Effects Requiring Management

The following primary process sampling system aging effects require management:

- Cracking
- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the primary process sampling system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.3.2.1.9 Chilled Water HVAC System

Materials

The materials of construction for the chilled water HVAC system component types are:

- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Copper Alloy (> 15 percent Zinc)
- Glass
- Stainless Steel
- Titanium

Environment

The chilled water HVAC system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Demineralized Water
- Dry Gas
- Lubricating Oil
- Plant Indoor Air
- Raw Water

Aging Effects Requiring Management

The following chilled water HVAC system aging effects require management:

- Loss of material
- Loss of preload
- Reduction of heat transfer
- Wall Thinning

Aging Management Programs

The following aging management programs manage the aging effects for the chilled water HVAC system component types:

- Flow-Accelerated Corrosion (B2.1.6)
- Bolting Integrity (B2.1.7)

- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

3.3.2.1.17 Fire Protection System

Materials

The materials of construction for the fire protection system component types are:

- Aluminum
- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Ductile Iron
- Elastomer
- Stainless Steel

Environment

The fire protection system component types are exposed to the following environments:

- Atmosphere/ Weather
- Borated Water Leakage
- Buried
- Closed-Cycle Cooling Water
- Concrete
- Diesel Exhaust
- Dry Gas
- Encased in Concrete
- Fuel Oil
- Plant Indoor Air
- Raw Water
- Ventilation Atmosphere

Aging Effects Requiring Management

The following fire protection system aging effects require management:

- Cracking
- Hardening and loss of material
- Loss of material
- Loss of preload

- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the aging effects for the fire protection system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Buried Piping and Tanks Inspection (B2.1.18)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Fire Protection (B2.1.12)
- Fire Water System (B2.1.13)
- Fuel Oil Chemistry (B2.1.14)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Selective Leaching of Materials (B2.1.17)

3.3.2.1.19 Chemical and Volume Control System

Materials

The materials of construction for the chemical and volume control system component types are:

- Aluminum
- Carbon Steel
- Cast Iron (Gray Cast Iron)
- Copper Alloy (>15% Zinc)
- Copper Alloy
- Insulation Calcium Silicate
- Insulation Fiberglass
- Nickel Alloys
- Stainless Steel
- Stainless Steel Cast Austenitic
- Thermoplastics

Environment

The chemical and volume control system component types are exposed to the following environments:

- Borated Water Leakage
- Closed-Cycle Cooling Water
- Demineralized Water
- Dry Gas
- Lubricating Oil
- Plant Indoor Air
- Reactor Coolant
- Secondary Water
- Steam
- Treated Borated Water
- Zinc Acetate

Aging Effects Requiring Management

The following chemical and volume control system aging effects require management:

- Cracking

- Loss of material
- Loss of preload
- Reduction of heat transfer
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the chemical and volume control system component types:

- ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)
- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- One-Time Inspection of ASME Code Class 1 Small-Bore Piping (B2.1.19)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

3.3.2.1.23 Radioactive Vents and Drains System

Materials

The materials of construction for the radioactive vents and drains system component types are:

- Carbon Steel
- Ductile Iron
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The radioactive vents and drains system component types are exposed to the following environments:

- Borated Water Leakage
- Demineralized Water
- Encased in Concrete
- Plant Indoor Air
- Raw Water
- Treated Borated Water
- Ventilation Atmosphere

Aging Effects Requiring Management

The following radioactive vents and drains system aging effects require management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the radioactive vents and drains system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.3.2.1.24 Nonradioactive Waste Plumbing Drains and Sump System

Materials

The materials of construction for the nonradioactive waste plumbing drains and sump system component types are:

- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Ductile Iron
- Polyvinyl Chloride (PVC)
- Stainless Steel

Environment

The nonradioactive waste plumbing drains and sump system component types are exposed to the following environments:

- Atmosphere/ Weather
- Borated Water Leakage
- Encased in Concrete
- Plant Indoor Air
- Raw Water

Aging Effects Requiring Management

The following nonradioactive waste plumbing drains and sump system aging effects require management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the nonradioactive waste plumbing drains and sump system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Materials (B2.1.17)

3.3.2.1.25 Oily Waste System

Materials

The materials of construction for the oily waste system component types are:

- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Ductile Iron
- Stainless Steel

Environment

The oily waste system component types are exposed to the following environments:

- Borated Water Leakage
- Buried
- Encased in Concrete
- Plant Indoor Air
- Raw Water

Aging Effects Requiring Management

The following oily waste system aging effect requires management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the oily waste system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Buried Piping and Tanks Inspection (B2.1.18)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Selective Leaching of Materials (B2.1.17)

3.3.2.1.26 Radiation Monitoring (area and process) Mechanical System

Materials

The materials of construction for the radiation monitoring (area and process) mechanical system component types are:

- Carbon Steel
- Elastomer
- Glass
- Stainless Steel

Environment

The radiation monitoring (area and process) mechanical system component types are exposed to the following environment:

- Borated Water Leakage
- Plant Indoor Air

Aging Effects Requiring Management

The following radiation monitoring (area and process) mechanical system aging effects require management:

- Loss of material
- Loss of preload

Aging Management Programs

The following aging management programs manage the aging effects for the radiation monitoring (area and process) mechanical system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)

3.3.2.1.27 Miscellaneous Systems In-Scope ONLY based on Criterion 10 CFR 54.4(a)(2)

Materials

The materials of construction for the miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types are:

- Aluminum
- Carbon Steel
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Copper Alloy (Aluminum > 8 percent)
- Copper Alloy (Zinc > 15 percent)
- Ductile Iron
- Glass
- Nickel-Alloys
- Polyvinyl Chloride (PVC)
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types are exposed to the following environments:

- Atmosphere/ Weather
- Borated Water Leakage
- Closed-Cycle Cooling Water
- Demineralized Water
- Dry Gas
- Plant Indoor Air
- Potable Water
- Raw Water
- Secondary Water
- Treated Borated Water

Aging Effects Requiring Management

The following miscellaneous systems in-scope ONLY based on Criterion 10 CFR 54.4(a)(2) aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the miscellaneous systems in scope ONLY based on Criterion 10 CFR 54.4(a)(2) component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Open-Cycle Cooling Water System (B2.1.9)
- Selective Leaching of Aluminum Bronze (B2.1.37)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

Table 3.3.1 Summary of Aging Management Evaluations in Chapter VII of NUREG-1801 for Auxiliary Systems

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.87	Boraflex spent fuel storage racks neutron-absorbing sheets exposed to treated borated water	Reduction of neutron-absorbing capacity due to boraflex degradation	Boraflex Monitoring	No	Not applicable. STP takes no credit for the Spent Fuel Rack Boraflex Neutron Absorber in Region 1 of the Spent Fuel Pool. Soluble boron is credited to provide safety margin by maintaining keff <.0.95 including uncertainties, tolerances, and accident conditions in the presence of spent fuel pool soluble boron as discussed in UFSAR 9.1.2.
3.3.1.88	Aluminum and copper alloy >15% Zn piping, piping components, and piping elements exposed to air with borated water leakage	Loss of material due to Boric acid corrosion	Boric Acid Corrosion (B2.1.4)	No	~~Not applicable. STP has no in scope aluminum or copper alloy > 15 percent ZN piping, piping components, or piping elements exposed to air with borated water leakage in the auxiliary systems, so the applicable NUREG-1801 lines were not used.~~ Consistent with NUREG-1801.
3.3.1.89	Steel bolting and external surfaces exposed to air with borated water leakage	Loss of material due to Boric acid corrosion	Boric Acid Corrosion (B2.1.4)	No	Consistent with NUREG-1801.

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation – Spent Fuel Pool Cooling and Cleanup System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.A3-10	3.3.1.90	E, 3, 4
Heat Exchanger (Spent Fuel Pool)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (Spent Fuel Pool)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.A3-3	3.3.1.48	B

Table 3.3.2-4 Auxiliary Systems – Summary of Aging Management Evaluation – Essential Cooling Water and ECW Screen Wash System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB, LBS, SIA	Carbon Steel	Borated Water Leakage	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	PB, SIA	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.C1-18	3.3.1.19	D
Flow Element	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	B
Heat Exchanger (CCW Pump Room)	HT	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Heat Exchanger (CCW Pump Room)	HT	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C
Heat Exchanger (CCW Pump Room)	HT	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, PB, SIA	Copper Alloy	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-9	3.3.1.81	B
Piping	LBS, PB, SIA	Copper Alloy (Aluminum > 8%)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	None	None	G
Piping	PB	Copper Alloy (Aluminum > 8%)	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	None	None	G

Table 3.3.2-6 Auxiliary Systems – Summary of Aging Management Evaluation – Component Cooling Water System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Flow Element	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Heat Exchanger (CCW Heat Exchanger)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (CCW Heat Exchanger)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-1	3.3.1.48	B
Heat Exchanger (Chg Pump Room)	HT, PB	Copper Alloy	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Heat Exchanger (RCP Bearing Oil Cooler)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (RCP Bearing Oil Cooler)	PB	Carbon Steel	Closed Cycle Cooling Water (Ext)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-1	3.3.1.48	B

Table 3.3.2-6 Auxiliary Systems – Summary of Aging Management Evaluation – Component Cooling Water System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (RCP Bearing Oil Cooler)	PB	Copper Alloy	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.C2-5	3.3.1.26	D
Heat Exchanger (RCP Motor Air Cooler)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (RCP Motor Air Cooler)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-1	3.3.1.48	B
Orifice	PB, TH	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS, PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	PB	Copper Alloy (>15% Zinc)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-12	3.3.1.88	A
Piping	PB	Copper Alloy (>15% Zinc)	Plant Indoor Air (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	None	None	G, 3
Piping	LBS, PB, SIA	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-10	3.3.1.50	B

Table 3.3.2-6 Auxiliary Systems – Summary of Aging Management Evaluation – Component Cooling Water System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS, PB, SIA	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	A
Piping	PB, LBS, SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Solenoid Valve	PB	Copper Alloy (>15% Zinc)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Tank	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	LBS, PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B

Notes for Table 3.3.2-6:

Standard Notes:

A	Consistent with NUREG 1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG 1801 AMP.
B	Consistent with NUREG 1801 item for component, material, environment, and aging effect. AMP takes some exceptions to NUREG 1801 AMP.
D	Component is different, but consistent with NUREG 1801 item for material, environment, and aging effect. AMP takes some exceptions to NUREG 1801 AMP.
E	Consistent with NUREG 1801 for material, environment, and aging effect, but a different aging management program is credited or NUREG 1801 identifies a plant-specific aging management program.
F	Material not in NUREG-1801 for this component.
G	Environment not in NUREG-1801 for this component and material.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.

Plant Specific Notes:

1	Loss of preload is conservatively considered to be applicable for all closure bolting.
2	The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) manage loss of material due to pitting and crevice corrosion and cracking due to stress corrosion cracking. The One-Time Inspection program (B2.1.16) includes selected components at susceptible locations
3	Non-inhibited copper alloy >15% zinc SSCs with surfaces exposed to ventilation atmosphere (internal) or plant indoor air (internal) are subject to wetting due to condensation and thus are subject to loss of material due to selective leaching.

Table 3.3.2-7 Auxiliary Systems – Summary of Aging Management Evaluation – Compressed Air System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Accumulator	PB	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.D-2	3.3.1.53	E, 2
Closure Bolting	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Heat Exchanger (Air)	HT, PB	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.D-2	3.3.1.53	E, 2
Heat Exchanger (BA Compressor Pkg Lube Oil)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (BA Compressor Pkg Lube Oil)	LBS	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-22	3.3.1.14	B
Heat Exchanger (BA Compressor Pkg Lube Oil)	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.G-5	3.3.1.59	B
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS, PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B

Table 3.3.2-7 Auxiliary Systems – Summary of Aging Management Evaluation – Compressed Air System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS, PB, SIA	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-22	3.3.1.14	B
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.D-3	3.3.1.57	B
Piping	PB, LBS, SIA	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.D-2	3.3.1.53	E, 2
Piping	PB, SIA	Carbon Steel (Galvanized)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB, SIA	Carbon Steel (Galvanized)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-22	3.3.1.14	B
Piping	PB, SIA	Carbon Steel (Galvanized)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	PB, SIA	Carbon Steel (Galvanized)	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.D-2	3.3.1.53	E, 2
Piping	PB	Copper Alloy (>15% Zinc)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB	Copper Alloy (>15% Zinc)	Plant Indoor Air (Int)	Loss of material	Selective Leaching (B2.1.17)	None	None	G, 3
Piping	PB, SIA	Stainless Steel	Plant Indoor Air (Ext0	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation – Primary Process Sampling System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Flow Element	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 1
Heat Exchanger (PASS Cont Sump Sample)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (PASS Cont Sump Sample)	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B
Heat Exchanger (PASS Cont Sump Sample)	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 1
Heat Exchanger (PASS RCS Sample)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (PASS RCS Sample)	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B
Heat Exchanger (PASS RCS Sample)	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 1
Heat Exchanger (PASS RHR Sample)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation – Primary Process Sampling System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (PASS RHR Sample)	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B
Heat Exchanger (PASS RHR Sample)	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 1
Heat Exchanger (PASS Spare Sample)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (PASS Spare Sample)	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation – Chilled Water HVAC System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Flow Element	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Heat Exchanger (AHU Condenser)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (AHU Condenser)	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Heat Exchanger (AHU Condenser)	HT, PB	Titanium	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	None	None	F
Heat Exchanger (AHU Evaporator)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (AHU Evaporator)	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Heat Exchanger (Lube Oil Cooler)	HT, PB	Stainless Steel	Lubricating Oil (Int)	Reduction of heat transfer	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-12	3.4.1.10	B
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS, PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation – Chilled Water HVAC System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	PB, LBS, SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.C2-13	3.3.1.14	B
Piping	PB, LBS, SIA	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.C2-13	3.3.1.14	B
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	LBS	Carbon Steel (Galvanized)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS	Carbon Steel (Galvanized)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Piping	PB, SIA	Copper Alloy (> 15% Zinc)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-12	3.3.1.88	A
Piping	PB, SIA	Copper Alloy (> 15% Zinc)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	B
Piping	PB, SIA	Copper Alloy (> 15% Zinc)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.F2-15	3.3.1.84	B
Piping	PB, SIA	Copper Alloy (> 15% Zinc)	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	A
Piping	PB, SIA	Copper Alloy (> 15% Zinc)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.C2-5	3.3.1.26	B

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation – Chilled Water HVAC System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Pump	LBS, PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Strainer	LBS	Carbon Steel (Galvanized)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Tank	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	LBS, PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B

Table 3.3.2-17 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-1	3.3.1.43	B
Closure Bolting	PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.G-25	3.3.1.19	B
Orifice	PB, TH	Stainless Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13)	VII.G-19	3.3.1.69	B
Piping	PB	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	A
Piping	PB	Aluminum	Dry Gas (Int)	None	None	VII.J-2	3.3.1.97	A
Piping	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	B
Piping	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB	Carbon Steel	Diesel Exhaust (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.H2-2	3.3.1.18	E
Piping	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H2-24	3.3.1.20	B

Table 3.3.2-17 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping (Halon)	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	PB	Carbon Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13)	VII.G-24	3.3.1.68	B
Piping	PB, SIA	Carbon Steel (Galvanized)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	B
Piping	PB, SIA	Carbon Steel (Galvanized)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	B
Piping	PB, LBS, SIA, SP	Carbon Steel (Galvanized)	Borated Water Leakage	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS, PB, SIA, SP	Carbon Steel (Galvanized)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B
Piping	PB, LBS, SIA, SP	Carbon Steel (Galvanized)	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	B
Piping	LBS, PB, SIA, SP	Carbon Steel (Galvanized)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13)	VII.G-24	3.3.1.68	B
Piping	PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

Table 3.3.2-19 Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Chiller	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Chiller	LBS, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	IV.C2-15	3.1.1.83	E, 2
Closure Bolting	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Flow Indicator	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (Conc Boric Acid Sample Clr)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (Conc Boric Acid Sample Clr)	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B

Table 3.3.2-19 Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (Conc Boric Acid Sample Clr)	LBS	Nickel-Alloys	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	None	None	G
Heat Exchanger (CVCS BTRS Letdown Chiller)	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (CVCS BTRS Letdown Chiller)	LBS, SIA	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	A
Heat Exchanger (CVCS BTRS Moderating)	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (CVCS Excess Letdown)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (CVCS Excess Letdown)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B
Heat Exchanger (CVCS Excess Letdown)	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (CVCS Letdown)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (CVCS Letdown)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B

Table 3.3.2-19 Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Heat Exchanger (CVCS Regenerative)	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (CVCS Seal Water Return)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (CVCS Seal Water Return)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.E1-6	3.3.1.48	B
Heat Exchanger (CVCS Seal Water Return)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-17	3.3.1.91	E, 2
Heat Exchanger (Lube Oil Cooler)	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Heat Exchanger (Lube Oil Cooler)	LBS	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-19	3.3.1.14	D
Heat Exchanger (Lube Oil Cooler)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Insulation	INS	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C

Table 3.3.2-19 Auxiliary Systems – Summary of Aging Management Evaluation – Chemical and Volume Control System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Orifice	PB, TH	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E, 2
Piping	LBS, PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Piping	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	A, 2
Piping	LBS	Copper Alloy	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Piping	PB	Copper Alloy (>15% Zinc)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-12	3.3.1.88	A
Piping	PB	Copper Alloy (>15% Zinc)	Plant Indoor Air (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	None	None	G, 3
Piping	LBS, PB, SIA	Stainless Steel	Borated Water Leakage (Ext)	None	None	VII.J-16	3.3.1.99	A
Strainer	LBS	Copper Alloy	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Tank	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-1	3.3.1.89	A
Tank	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	C, 2

Table 3.3.2-22 Auxiliary Systems – Summary of Aging Management Evaluation – Liquid Waste Processing System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	PB, LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Flow Element	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E, 4
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Carbon Steel	Borated Water Leakage	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Heat Exchanger (RCDT Heat Exchanger)	LBS, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-1	3.3.1.48	B
Orifice	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-20	3.3.1.90	E, 4
Piping	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B
Strainer	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tank	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

Table 3.3.2-23 Auxiliary Systems – Summary of Aging Management Evaluation – Radioactive Vents and Drains System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B

Table 3.3.2-24 Auxiliary Systems – Summary of Aging Management Evaluation – Nonradioactive Waste Plumbing and Sumps System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	LBS	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB	Carbon Steel	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	A
Piping	LBS, SIA	Carbon Steel	Raw Water (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.C1-19	3.3.1.76	E, 3
Piping	PB, LBS, SIA	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, 2
Piping	LBS, SIA	Carbon Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-19	3.3.1.76	E, 2
Piping	LBS	Carbon Steel (Galvanized)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	B
Piping	PB, LBS	Carbon Steel (Galvanized)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB	Carbon Steel (Galvanized)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	A

Table 3.3.2-25 Auxiliary Systems – Summary of Aging Management Evaluation – Oily Waste System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.C1-18	3.3.1.19	D
Closure Bolting	PB	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Piping	PB	Carbon Steel (Galvanized	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB	Carbon Steel (Galvanized)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

Table 3.3.2-26 Auxiliary Systems – Summary of Aging Management Evaluation – Radiation Monitoring (area and process) Mechanical System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Flow Element	PB	Stainless Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-1	3.3.1.27	E
Piping	PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

Table 3.3.2-27 Auxiliary Systems – Summary of Aging Management Evaluation – Miscellaneous Systems in scope ONLY for Criterion 10 CFR 54.4(a)(2)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	SIA	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-1	3.4.1.22	B
Closure Bolting	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-2	3.3.1.89	A
Closure Bolting	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Piping	SIA	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-8	3.4.1.28	D
Piping	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Piping	LBS, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-14	3.3.1.47	B
Piping	SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	SIA	Carbon Steel	Dry Gas (Int)	None	None	VIII.I-15	3.4.1.44	A
Piping	LBS	Carbon Steel	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	LBS, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

Table 3.3.2-27 Auxiliary Systems – Summary of Aging Management Evaluation – Miscellaneous Systems in scope ONLY for Criterion 10 CFR 54.4(a)(2) (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Piping	LBS	Copper Alloy	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	LBS	Copper Alloy (>15% Zinc)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-12	3.3.1.88	A
Piping	LBS	Copper Alloy (>15% Zinc)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Strainer	LBS	Stainless Steel	Raw Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.C1-15	3.3.1.79	E, 3
Tank	LBS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.I-10	3.3.1.89	A
Tank	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	B

3.4.2.1.1 Main Steam System

Materials

The materials of construction for the main steam system component types are:

- Aluminum
- Carbon Steel
- Copper Alloy
- Insulation Calcium Silicate
- Insulation Fiberglass
- Stainless Steel

Environment

The main steam system components are exposed to the following environments:

- Atmosphere/Weather
- Borated Water Leakage
- Dry Gas
- Lubricating Oil
- Plant Indoor Air
- Secondary Water
- Steam

Aging Effects Requiring Management

The following main steam system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the main steam system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)

- Flow-Accelerated Corrosion (B2.1.6)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.4.2.1.2 Auxiliary Steam System and Boilers

Materials

The materials of construction for the auxiliary steam system and boilers component types are:

- Carbon Steel
- Copper Alloy (>15% Zinc)
- Stainless Steel

Environment

The auxiliary steam system and boilers components are exposed to the following environments:

- Borated Water Leakage
- Plant Indoor Air
- Steam

Aging Effects Requiring Management

The following auxiliary steam system and boilers aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the auxiliary steam system and boilers component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- One-Time Inspection (B2.1.16)
- Selective Leaching of Materials (B2.1.17)
- Water Chemistry (B2.1.2)

3.4.2.1.3 Feedwater System

Materials

The materials of construction for the feedwater system component types are:

- Aluminum
- Carbon Steel
- Insulation Calcium Silicate
- Insulation Fiberglass
- Stainless Steel

Environment

The feedwater system components are exposed to the following environments:

- Borated Water Leakage
- Dry Gas
- Lubricating Oil
- Plant Indoor Air
- Secondary Water

Aging Effects Requiring Management

The following feedwater system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the feedwater system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- Lubricating Oil Analysis (B2.1.23)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.4.2.1.4 Demineralizer Water (Make-up) System

Materials

The materials of construction for the demineralized water (make-up) system component types are:

- Carbon Steel
- Copper Alloy
- Stainless Steel

Environment

The demineralized water (make-up) system components are exposed to the following environments:

- Atmosphere/ Weather
- Borated Water Leakage
- Demineralized Water
- Plant Indoor Air

Aging Effects Requiring Management

The following demineralized water (make-up) system aging effects require management:

- Loss of material
- Loss of preload
- Wall Thinning

Aging Management Programs

The following aging management programs manage the aging effects for the demineralized water (make-up) system component types:

- Flow-Accelerated Corrosion (B2.1.6)
- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)
- External Surfaces Monitoring Program (B2.1.20)

3.4.2.1.5 Steam Generator Blowdown System

Materials

The materials of construction for the steam generator blowdown system component types are:

- Aluminum
- Carbon Steel
- Copper Alloy
- Insulation Calcium Silicate
- Insulation Fiberglass
- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

The steam generator blowdown system components are exposed to the following environments:

- Borated Water Leakage
- Demineralized Water
- Plant Indoor Air
- Secondary Water
- Steam

Aging Effects Requiring Management

The following steam generator blowdown system aging effects require management:

- Cracking
- Loss of material
- Loss of preload
- Wall thinning

Aging Management Programs

The following aging management programs manage the aging effects for the steam generator blowdown system component types:

- Bolting Integrity (B2.1.7)
- Boric Acid Corrosion (B2.1.4)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)

- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

Table 3.4.1 Summary of Aging Management Evaluations in Chapter VIII of NUREG-1801 for Steam and Power Conversion System

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.4.1.37	Steel, stainless steel, and nickel-based alloy piping, piping components, and piping elements exposed to steam	Loss of material due to pitting and crevice corrosion	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16) is credited.
3.4.1.38	Steel bolting and external surfaces exposed to air with borated water leakage	Loss of material due to boric acid corrosion	Boric Acid Corrosion (B2.1.4)	No	~~Not applicable. STP has no in scope components exposed to borated water leakage in the steam and power conversion systems, so the applicable NUREG-1801 lines were not used.~~ Consistent with NUREG-1801
3.4.1.39	Stainless steel piping, piping components, and piping elements exposed to steam	Cracking due to stress corrosion cracking	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16) is credited.

Table 3.4.2-1 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Accumulator	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	B
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Filter	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	C
Insulation	INS	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C
Piping	LBS, SIA	Carbon Steel	Atmosphere/ Weather (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-6	3.4.1.30	B
Piping	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	PB	Carbon Steel	Dry Gas (Int)	None	None	VIII.I-15	3.4.1.44	A

Table 3.4.2-2 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary Steam System and Boilers

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Flow Element	PB	Stainless Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-3	3.4.1.37	E, 1
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	D

Table 3.4.2-3 Steam and Power Conversion System – Summary of Aging Management Evaluation – Feedwater System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Flow Element	PB	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-5	3.4.1.14	A
Insulation	INS	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C
Orifice	LBS, SIA	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-5	3.4.1.14	A
Piping	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	B

Table 3.4.2-4 Steam and Power Conversion System – Summary of Aging Management Evaluation – Demineralized Water (Make-up) System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	SIA	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-1	3.4.1.22	B
Closure Bolting	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H,1
Closure Bolting	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Piping	LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	B

Table 3.4.2-5 Steam and Power Conversion System – Summary of Aging Management Evaluation – Steam Generator Blowdown System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Closure Bolting	LBS, PB, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-2	3.4.1.38	A
Closure Bolting	LBS, PB, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Flow Element	LBS, SIA	Stainless Steel	Steam (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-3	3.4.1.37	E, 2
Insulation	INS	Aluminum	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VII.E1-10	3.3.1.88	C
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	V.F-2	3.2.1.50	C
Insulation	INS	Insulation Calcium Silicate	Plant Indoor Air (Ext)	None	None	None	None	J
Piping	PB, LBS, SIA	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	VIII.H-9	3.4.1.38	A
Piping	LBS, SIA	Carbon Steel	Plant Indoor Air (Int)	Cumulative fatigue damage	Time-Limited Aging Analysis evaluated for the period of extended operation	VII.E1-18	3.3.1.02	A