WOLF CREEK
NUCLEAR OPERATING CORPORATION

August 31, 2007

Terry J. Garrett
Vice President, Engineering

ET 07-0038

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference:
1) Letter ET 06-0038, dated September 27, 2006, from T. J. Garrett, WCNOC, to USNRC
2) Letter ET 07-0011, dated May 2, 2007, from T. J. Garrett, WCNOC, to USNRC
3) Letter ET 07-0020, dated May 25, 2007, from T. J. Garrett, WCNOC, to USNRC
4) Letter WM 07-0050, dated June 1, 2007, from M. W. Sunseri, WCNOC, to USNRC
5) Letter WM 07-0051, dated June 7, 2007, from M. W. Sunseri, WCNOC, to USNRC
6) Letter ET 07-0028, dated July 11, 2007, from T. J. Garrett, WCNOC, to USNRC
7) Letter ET 07-0031, dated July 26, 2007, from T. J. Garrett, WCNOC, to USNRC

Subject: Docket No. 50-482: Wolf Creek Generating Station License renewal Application, Amendment 3

Gentlemen:

Reference 1 provided Wolf Creek Nuclear Operating Corporation's (WCNOC) License Renewal Application (LRA) for the Wolf Creek Generating Station (WCGS). As part of the review for license renewal, the Nuclear Regulatory Commission (NRC) staff conducted two audits at WCGS. The LRA Aging Management Program audit was conducted during the week of March 26, 2007 and the LRA Aging Management Review during the week of May 7, 2007. During the course of these two audits, WCNOC

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responded to NRC staff questions with commitments to amend the WCGS LRA. These questions and responses are provided in Reference 3.

In addition to the questions and responses compiled during the audits, the NRC provided requests for additional information (RAI). In references 2, 4, 5, 6 and 7 WCNOC committed to amend the WCGS LRA in response to the NRC RAIs.

This submittal includes four enclosures. Enclosures 1, 2, 3, and 4 include the amended pages in Appendix B, Chapter 2 and Chapter 3 of the WCGS LRA respectfully.

There are no new commitments in this letter. If you have any questions concerning this matter, please contact me at (620) 364-4084, or Mr. Kevin Moles at (620) 364-4126.

Sincerely,

Terry J. Garrett

TJG/rlt

Enclosures: 1: Appendix A Amendment of the WCGS LRA
2: Appendix B Amendment of the WCGS LRA
3: Chapter 2 Amendment of the WCGS LRA
4: Chapter 3 Amendment of the WCGS LRA

cc: J. N. Donohew (NRC), w/e
V. G. Gaddy (NRC), w/e
B. S. Mallett (NRC), w/e
V. Rodriguez (NRC), w/e
Senior Resident Inspector (NRC), wo/e

S TATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Terry J. Garrett, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By______________________________
Terry J. Garrett
Vice President Engineering

SUBSCRIBED and sworn to before me this 31st day of August 2007.

RHONDA L. TIEMEYER
MY COMMISSION EXPIRES
January 11, 2010
NOTARY PUBLIC OFFICIAL SEAL STATE OF KANSAS

Rhonda L. Tiemeyer
Notary Public

Expiration Date January 11, 2010

Wolf Creek Generating Station (WCGS) License Renewal Application (LRA) Amendment Appendix A

A0 APPENDIX A INTRODUCTION

Introduction

This appendix provides the information to be submitted in an Updated Safety Analysis Report Supplement as required by 10 CFR 54.21(d) for the WCGS License Renewal Application. Section A1 of this appendix contains summary descriptions of the programs used to manage the effects of aging during the period of extended operation. Section A2 contains summary descriptions of programs used for management of time-limited aging analyses during the period of extended operation. Section A3 contains evaluation summaries of TLAAs for the period of extended operation. These summary descriptions of aging management program activities and time-limited aging analyses will be incorporated in the Updated Safety Analysis Report for the WCGS following issuance of the renewed operating license in accordance with 10 CFR 50.71(e).

A1 SUMMARY DESCRIPTIONS OF AGING MANAGEMENT PROGRAMS

The integrated plant assessment and evaluation of time-limited aging analyses (TLAA) identified existing and new aging management programs necessary to provide reasonable assurance that components within the scope of License Renewal will continue to perform their intended functions consistent with the current licensing basis (CLB) for the period of extended operation. Sections A1 and A2 describe the programs and their implementation activities.

Three elements common to all aging management programs discussed in Sections A1 and A2 are corrective actions, confirmation process, and administrative controls. These elements are included in the WCNOC Quality Assurance (QA) Program, which implements the requirements of 10 CFR 50, Appendix B and are applicable to the safety-related and nonsafety-related systems, structures and components that are subject to aging management review activities.

A1.1 ASME SECTION XI INSERVICE INSPECTION, SUBSECTIONS IWB, IWC, AND IWD

ASME Section XI Inservice Inspection, Subsections IWB, IWC, & IWD inspections are performed to manage aging in Class 1, 2, and 3 piping and components within the scope of license renewal. The program includes periodic visual, surface, volumetric examinations and leakage tests of Class 1, 2 and 3 pressure-retaining components, including welds, pump casings, valve bodies, integral attachments, and pressure-retaining bolting. WCGS inspections meet ASME Section XI requirements and can manage aging such as cracking, surface and subsurface discontinuities, loss of material, loss of fracture toughness, and physical damage. The WCGS ISI Program is in accordance with 10 CFR 50.55a and ASME Section XI, 1998 edition through 2000 addenda.

A1.2 WATER CHEMISTRY

The Water Chemistry program includes maintenance of the chemical environment in the reactor coolant system and related auxiliary systems containing treated borated water and includes maintenance of the chemical environment in the steam generator secondary side and the secondary cycle systems to limit loss of material and cracking. The Water Chemistry Program is based upon the EPRI primary and secondary water chemistry guidelines.

A1.3 REACTOR HEAD CLOSURE STUDS

The Reactor Head Closure Studs program includes periodic visual, surface, and volumetric examinations of reactor vessel flange stud hole threads, reactor head closure studs, nuts, and washers and performs visual inspection of the reactor vessel flange closure during primary system leakage tests. The program implements ASME Section XI code, Subsection IWB, 1998 Edition through the 2000 addenda and detects reactor vessel stud, nut and washer cracking, loss of material due to wear and corrosion, and reactor coolant leakage from the reactor vessel flange.

A1.4 BORIC ACID CORROSION

The Boric Acid Corrosion program manages loss of material due to boric acid corrosion. The program includes provisions to identify, inspect, examine and evaluate leakage, and initiate corrective actions. The program relies in part on implementation of recommendations of NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR plants." Additionally, the program includes examinations conducted during ISI pressure tests performed in accordance with ASME Section XI requirements. The program addresses recent operating experience noted in NRC Regulatory Issue Summary 2003, "NRC Review of Responses to Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," (which includes NRC Bulletin 2002-01, 2002-02, and NRC Order EA-03-009).

Prior to the period of extended operation, procedures will be enhanced to state that susceptible components adjacent to potential leakage sources will include electrical components and connectors.

A1.5 NICKEL-ALLOY PENETRATION NOZZLES WELDED TO THE UPPER REACTOR VESSEL CLOSURE HEADS OF PRESSURIZED WATER REACTORS

The Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors program manages cracking due to primary water stress corrosion cracking and loss of material due to boric acid wastage in nickel-alloy vessel head penetration nozzles and includes the reactor vessel closure head, upper vessel head penetration nozzles and associated welds. This program was developed in response to NRC Order EA-03-009.

Detection of cracking is accomplished through implementation of a combination of bare metal visual examination (external surface of head) and non-visual examination (underside of head) techniques. Procedures are developed to perform reactor vessel head bare metal inspections and calculations of the susceptibility ranking of the plant. Examinations are performed by Level II or III VT-2 certified personnel. Inspections completed to date have indicated no evidence of cracking in the vessel head penetration nozzles. Completed testing to date verifies a susceptibility ranking of "Low" per EA-03-009, as amended. Plants in the "Low" category require bare metal visual inspections every third refueling outage or every five years (whichever comes first) and ultrasonic, eddy current, or dye penetrant testing every fourth refueling outage or every seven years (whichever comes first) per the Order, as amended.

Prior to the period of extended operation, procedures will be enhanced to indicate that detection of leakage or evidence of cracking in the vessel head penetration nozzles or associated welds will cause an immediate reclassification to the "High" susceptibility ranking, commencing from the same outage in which the leakage or cracking is detected.

A1.6 FLOW-ACCELERATED CORROSION

The Flow-Accelerated Corrosion (FAC) program manages aging effects of wall thinning due to FAC on the internal surfaces of carbon or low alloy steel piping, elbows, reducers, expanders, and valve bodies which contain high energy fluids (both single phase and two phases).

The objectives of the FAC program are achieved by (a) identifying system components susceptible to FAC, (b) an analysis using a predictive code such as CHECWORKS to determine critical locations for inspection and evaluation, (c) providing guidance of follow-up inspections, (d) repairing or replacing components, as determined by the guidance provided by the program, and (e) continual evaluation and incorporation of the latest technologies, industry and plant in-house operating experience.

Procedures and methods used by the FAC program are consistent with WCGS commitments to NRC Bulletin 87-01, "Thinning of Pipe Wall in Nuclear Power Plants," and NRC Generic Letter 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning."

A1.7 BOLTING INTEGRITY

The Bolting Integrity program manages the aging effects of cracking, loss of material, and loss of preload for pressure retaining bolting and ASME component support bolting. The program includes preload control, selection of bolting material, use of lubricants/sealants consistent with EPRI good bolting practices, and performance of periodic inspections for indication of aging techniques. The program also includes the inservice inspection requirements established in accordance with ASME Section XI, Subsections IWB, IWC, IWD, and IWF for ASME Class bolting.

WCGS good bolting practices are established in accordance with plant procedures. These procedures include requirements for proper disassembling, inspecting, and assembling of connections with threaded fasteners. The general practices that are established in this program are consistent with EPRI NP-5069, "Good Bolting Practices, Volume 1 and Volume 2," and EPRI TR-104213, "Bolted Joint Maintenance and Applications Guide."

A1.8 STEAM GENERATOR TUBE INTEGRITY

The Steam Generator Tube Integrity program includes the preventive measures, condition monitoring inspections, degradation assessment, repair and leakage monitoring activities necessary to manage cracking and loss of material. The aging management measures employed include non-destructive examination, visual inspection, sludge removal, tube plugging, in-situ pressure testing, maintaining the chemistry environment by removal of impurities and addition of chemicals to control pH and oxygen.

NDE inspection scope and frequency, and primary to secondary leak rate monitoring are conducted consistent with the requirements of WCGS Unit 1 Technical Specifications. Structural integrity limits consistent with Regulatory Guide 1.121, Revision 0, "Bases for Plugging Degraded PWR Steam Generator Tubes," are applied. Steam generator management practices are consistent with NEI 97-06 "Steam Generator Program Guidelines" with minor exceptions that have been reviewed and provided with a technical justification.

A1.9 OPEN-CYCLE COOLING WATER SYSTEM

The Open-Cycle Cooling Water (OCCW) System program manages loss of material and reduction of heat transfer for components exposed to raw water. The program includes chemical treatment and control of biofouling; heat exchanger performance testing; and periodic inspections to ensure that the effects of aging will be managed on the OCCW systems or structures and components serviced by the OCCW systems for the period of extended operation. The program is consistent with commitments as established in WCGS responses to NRC Generic Letter 89-13 "Service Water System Problems Affecting Safety-Related Components."

The Open-Cycle Cooling Water System program provides the general requirements for implementation and maintenance of programs and activities which mitigate aging of OCCW systems and components. The various aspects of the WCGS program (control, monitoring, maintenance and inspections) are implemented in station procedures.

A1.10 CLOSED-CYCLE COOLING WATER SYSTEM

The Closed-Cycle Cooling Water System Program manages loss of material, cracking, and reduction in heat transfer for components in closed cycle cooling water systems. The program includes maintenance of system corrosion inhibitor concentrations and chemistry parameters following the guidance of EPRI TR-107396 to minimize aging, and periodic testing and inspections to evaluate system and component performance. Inspection methods include visual, ultrasonic testing (UT) and eddy current testing (ECT).

Prior to the period of extended operation, a new periodic preventive maintenance activity will be developed to specify performing inspections of the internal surfaces of valve bodies and accessible piping while the valves are disassembled for operational readiness inspections to detect loss of material and fouling. The acceptance criteria will be specified in this preventive maintenance activity. In addition, visual inspection procedures used for identification of stress corrosion cracking will be enhanced to define cracking, provide additional guidance for detection of cracking and identify specific acceptance criteria relating to "as-found" cracking.

A1.11 INSPECTION OF OVERHEAD HEAVY LOAD AND LIGHT LOAD (RELATED TO REFUELING) HANDLING SYSTEMS

The Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems program manages the loss of material due to corrosion and the effects of rail wear for all cranes, trolley structural components and applicable rails within the scope of license renewal. The program is implemented through periodic visual inspections of components.

Crane inspection activities verify structural integrity of the crane components required to maintain the crane intended function. Visual inspections assess conditions such as loss of material due to corrosion of structural members, misalignment, flaking, side wear of rails, loose tie down bolts and excessive wear or deformation of monorails. The inspection requirements are consistent with the guidance provided by NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" for load handling systems that handle heavy loads which can directly or indirectly cause a release of radioactive material, applicable industry standards (such as CMAA Spec 70 and ANSI B30.11) for other cranes within the scope of license renewal, and applicable OSHA regulations (such as 29 CFR Volume XVII, Part 1910 and Section 1910.179).

Prior to the period of extended operation, procedures will be enhanced to identify industry standards or WCGS specifications that are applicable to the component and to specifically inspect for loss of material due to corrosion or rail wear.

A1.12 FIRE PROTECTION

The Fire Protection program manages loss of material for fire rated doors, fire dampers, diesel-driven fire pump, and the halon fire suppression system, cracking, spalling, and loss of material for fire barrier walls, ceilings, and floors, hardness and shrinkage due to weathering of fire barrier penetration seals, and hardness – loss of strength for halon fire suppression system flexible hoses. Periodic visual inspections of fire barrier penetration seals, fire dampers, fire barrier walls, ceilings and floors, and periodic visual inspections and functional tests of fire-rated doors are performed. The internal surface of the diesel-driven fire pump fuel oil supply line is managed by the Fuel Oil Chemistry program (A1.14), which utilizes the One-Time Inspection program (A1.16) to verify the effectiveness of the Fuel Oil Chemistry program using a representative sample of components in systems that contain fuel oil, ensuring that there is no loss of function due to aging of the fuel oil supply line.

Drop tests on approximately 10 percent of accessible horizontal and vertical fire dampers are performed on an 18 month basis. Fire dampers that are inaccessible for drop testing are visually inspected to assess integrity/availability. Visual inspections are performed on fire-rated doors at least once per year to verify the integrity of door surfaces and for clearances to detect aging of the fire doors. A visual inspection and function test of the halon fire suppression system is performed every 18 months. Approximately 10 percent of each type (electrical and mechanical as practical) of penetration seal is visually inspected at least once every 18 months. Fire barrier walls, ceilings, and floors including coatings and wraps (structural steel fireproofing, raceway fire wrap and hatch covers) are visually inspected at least once every 18 months.

Prior to the period of extended operation, fire damper inspection and drop test procedures will be enhanced to inspect damper housing for signs of corrosion and to specify fire barriers and doors described in USAR Appendix 9.5A, "WCGS Fire Protection Comparison to APCSB 9.5-1 Appendix A," and WCGS Fire Hazards Analysis. Training for technicians performing the fire door and fire damper visual inspections will be enhanced to include fire protection inspection requirements and training documentation.

Prior to the period of extended of operation, halon fire suppression system inspection procedures will be enhanced to include visual inspection of halon tank flexible hoses for hardening - loss of strength. Visual inspections would not be required for flexible hoses that have scheduled periodic replacement intervals.

A1.13 FIRE WATER SYSTEM

The Fire Water System program manages loss of material for water-based fire protection systems. Periodic hydrant inspections, fire main flushing, sprinkler inspections, and flow tests are performed considering applicable National Fire Protection Association (NFPA) codes and standards. Nuclear Electric Insurance Limited (NEIL) performance based guidance is utilized for fire protection system inspection, testing, and maintenance intervals. The fire water system discharge pressure is continuously monitored such that loss of system pressure is immediately detected and corrective actions are initiated. The Fire Water System program conducts an air or water flow test through each open head spray/sprinkler head to verify that each open head spray/sprinkler nozzle is unobstructed. The Fire Water System program tests a representative sample of fire protection sprinkler heads or replaces those that have been in service for 50 years, using the guidance of NFPA 25, 2002 Edition, and tests at 10 year intervals thereafter during the period of extended operation to ensure that signs of aging are detected in a timely manner. Visual inspections of the fire protection system exposed to water, evaluating wall thickness to identify evidence of loss of material due to corrosion, are covered by the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (A1.22).

A1.14 FUEL OIL CHEMISTRY

The Fuel Oil Chemistry program manages loss of material on the internal surface of components in the emergency diesel fuel oil storage and transfer system and diesel fire pump fuel oil system. The program includes (a) surveillance and monitoring procedures for maintaining fuel oil quality by controlling contaminants in accordance with applicable ASTM Standards, (b) periodic draining of water from fuel oil tanks, (c) visual inspection of internal surfaces during periodic draining and cleaning of fuel oil tanks in the emergency diesel fuel oil storage and transfer system, (d) ultrasonic wall thickness measurements from external surfaces of fuel oil tanks, (e) one-time ultrasonic (UT) or pulsed eddy current (PEC) thickness examination on the external surface of the diesel fire pump fuel oil tank, (f) inspection of new fuel oil before it is introduced into the storage tanks, and (g) one-time inspections of a representative sample of components in systems that contain fuel oil by the One-Time Inspection program.

Prior to the period of extended operation, the emergency fuel oil day tanks will be added to the ten year drain, clean, and internal inspection program. Procedures will be enhanced to provide for supplemental ultrasonic thickness measurements if there are indications of reduced cross sectional thickness found during the visual inspection of the emergency fuel oil storage tanks.

A one-time ultrasonic (UT) or pulsed eddy current (PEC) thickness examination on the external surface of the diesel fire pump fuel oil tank will be performed to detect corrosion related wall-thinning. The examination will be performed once between 10 and 2 years prior to the period of extended operation.

A1.15 REACTOR VESSEL SURVEILLANCE

The Reactor Vessel Surveillance program is consistent with ASTM E 185. Actual reactor vessel coupons are used, but an exemption in the original license permits use of other than beltline weld material for the weld coupons. The surveillance coupons are tested by a qualified offsite vendor, to its procedures. The testing program and reporting conform to requirements of 10 CFR 50 Appendix H.

The schedule has been revised by removal of the last two coupon sets to the spent fuel pool, at exposures greater than those expected at the beltline wall at 60 years. This withdrawal therefore meets the ASTM E 185-82 criterion which states that capsules may be removed when the capsule neutron fluence is between one and two times the limiting fluence calculated for the vessel at the end of expected life. Vessel fluence is now determined by ex-vessel dosimetry. This schedule change has been approved by the NRC, as required by 10 CFR 50 Appendix H, "Reactor Vessel Material Surveillance Program Requirements."

A1.16 ONE-TIME INSPECTION

The One-Time Inspection program conducts one-time inspections of plant system piping and components to verify the effectiveness of the Water Chemistry program (A1.2), Fuel Oil Chemistry program (A1.14), and Lubricating Oil Analysis program (A1.23). The aging effects to be evaluated by the One-Time Inspection program are loss of material, cracking, and reduction of heat transfer. The One-Time Inspection program determines NDE sample size using the method described in EPRI Report TR-107514 and specifies piping/component location selection that is based on service period, operating conditions, and design margins. The One-Time Inspection program specifies corrective actions and increased sampling of components if aging effects are found during an inspection that leads to loss of component intended function.

This new program will be implemented and completed within the ten year period prior to the period of extended operation.

A1.17 SELECTIVE LEACHING OF MATERIALS

The Selective Leaching of Materials program manages the loss of material due to selective leaching for brass (>15% zinc) and gray cast iron components exposed to raw water or closed-cycle cooling water within the scope of license renewal. The Selective Leaching of Materials program is in addition to the Open Cycle Cooling Water program and the Closed Cycle Cooling Water program in these cases.

The program includes a one-time inspection (visual and mechanical methods) of a selected sample of component internal surfaces to determine whether loss of material due to selective leaching is occurring. If indications of selective leaching are confirmed, follow up examinations or evaluations are performed.

The Selective Leaching of Materials program is a new program that will be implemented prior to the period of extended operation.

A1.18 BURIED PIPING AND TANKS INSPECTION

The Buried Piping and Tanks Inspection program manages loss of material of buried components in the essential service water system, emergency diesel engine fuel oil storage and transfer system, auxiliary feedwater system, high pressure coolant injection system (borated refueling water storage system), and the fire protection system. Visual inspections monitor the condition of protective coatings and wrappings found on carbon steel, gray cast iron or ductile iron components and assess the condition of stainless steel components with no protective coatings or wraps. The program includes opportunistic inspection of buried piping and tanks as they are excavated or on a planned basis if opportunistic inspections have not occurred.

The Buried Piping and Tanks Inspection program is a new program that will be implemented prior to the period of extended of operation. Within the ten year period prior to entering the period of extended operation, an opportunistic or planned inspection will be performed. Upon entering the period of extended operation a planned inspection within ten years will be required unless an opportunistic inspection has occurred within this ten year period.

A1.19 ONE-TIME INSPECTION OF ASME CODE CLASS 1 SMALL-BORE PIPING

The One-Time Inspection of ASME Code Class 1 Small-Bore Piping program manages cracking of stainless steel ASME Code Class 1 piping less than or equal to 4 inches. This program is a part of the WCGS Risk-Informed Inservice Inspection (RI-ISI) program.

For ASME Code Class 1 small-bore piping, the RI-ISI program requires volumetric examinations (by ultrasonic testing) on selected weld locations to detect cracking. Weld locations are selected based on the guidelines provided in EPRI TR-112657. Ultrasonic examinations are conducted in accordance with ASME Section XI with acceptance criteria from Paragraph IWB-3131 and IWB-2430. The fourth interval of the ISI program at WCGS will provide the results for the one time inspection of ASME Code Class 1 small-bore piping.

A1.20 EXTERNAL SURFACES MONITORING PROGRAM

The External Surfaces Monitoring Program manages loss of material for external surfaces of steel components and hardening and loss of strength for elastomers in ventilation and mechanical systems. The External Surfaces Monitoring Program consists of periodic visual inspections for aging management of loss of material, leakage, elastomer hardening and loss of strength.

Loss of material for external surfaces is managed by the Boric Acid Corrosion program (A1.4) for components in a system with treated borated water or reactor coolant environment on which boric acid corrosion may occur, Buried Piping and Tanks Inspection program (A1.18) for buried components, and Structures Monitoring Program (A1.32) for supports, structural items, and electrical components.

A1.21 FLUX THIMBLE TUBE INSPECTION

The Flux Thimble Tube Inspection program performs wall thickness eddy current testing of all flux thimble tubes that form part of the reactor coolant system pressure boundary. The pressure boundary includes the length of the tube inside the reactor out to the seal fittings outside the reactor vessel. Eddy current testing is performed on the portion of the tubes inside the reactor vessel. The program implements the recommendations of NRC Bulletin 88-09, "Thimble Tube Thinning in Westinghouse Reactors."

During each outage, flux thimble tube wear is evaluated and inspections are performed based on evaluation results. Wall thickness measurements are trended and wear rates are calculated. If the predicted wear (as a measure of percent through wall) for a given flux thimble tube is projected to exceed the established acceptance criteria prior to the next outage, corrective actions are taken to reposition, cap or replace the tube.

A1.22 INSPECTION OF INTERNAL SURFACES IN MISCELLANEOUS PIPING AND DUCTING COMPONENTS

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program manages cracking, fouling, loss of material and hardening - loss of strength. Visual inspections of the internal surfaces of piping, piping components, ducting and other components that are not covered by other aging management programs is included in this program.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program uses the work control process to conduct and document inspections. The program performs visual inspections during periodic maintenance, predictive maintenance, surveillance testing and corrective maintenance to detect aging effects that could result in a loss of component intended function. For those systems or components where inspections of opportunity are insufficient, an inspection will be conducted prior to the period of extended operation to provide reasonable assurance that the intended functions are maintained.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program is a new program that will be implemented prior to the period of extended operation.

A1.23 LUBRICATING OIL ANALYSIS

The Lubricating Oil Analysis program manages loss of material and reduction of heat transfer for components within the scope of license renewal. The program maintains lubricating oil contaminants within acceptable limits, thereby preserving an environment that is not conducive to aging effects and includes acceptance criteria based on industry guidelines for oil chemical and physical properties, wear metals, contaminants, additives, and water. Increased impurities and degradation of oil properties provide an indication of aging of materials exposed to lubricating oil. Additionally, ferrography is performed on oil samples for trending of wear particle concentrations for the reactor coolant pumps upper and lower bearing oil and other components. Monitoring and trending of lubricating oil analysis results identifies component aging prior to loss of component intended function.

A1.24 ELECTRICAL CABLES AND CONNECTIONS NOT SUBJECT TO 10 CFR 50.49 ENVIRONMENTAL QUALIFICATION REQUIREMENTS

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program manages the aging effects of embrittlement, melting, cracking, swelling, surface contamination, or discoloration to ensure that electrical cables and connections not subject to the environmental qualification (EQ) requirements of 10 CFR 50.49 and within the scope of license renewal are capable of performing their intended functions.

Non-EQ cables and connections within the scope of license renewal in accessible areas with an adverse localized environment are inspected. The inspections of Non-EQ cables and connectors in accessible areas are representative, with reasonable assurance, of cables and connections in inaccessible areas with an adverse localized environment. At least once every ten years, the Non-EQ cables and connections within the scope of license renewal in accessible areas are visually inspected for embrittlement, melting, cracking, swelling, surface contamination, or discoloration.

The acceptance criterion for visual inspection of accessible Non-EQ cable jacket and connection insulating material is the absence of anomalous indications that are signs of degradation. Corrective actions for conditions that are adverse to quality are performed in accordance with the corrective action program as part of the QA program.

The Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program is a new program that will be implemented prior to the period of extended operation.

A1.25 ELECTRICAL CABLES AND CONNECTIONS NOT SUBJECT TO 10 CFR 50.49 ENVIRONMENTAL QUALIFICATION REQUIREMENTS USED IN INSTRUMENTATION CIRCUITS

The scope of this program includes the cables and connections used in sensitive instrumentation circuits with sensitive, high voltage low-level signals within the Ex-core Neutron Monitoring System including the source range, intermediate range, and power range monitors.

This program provides reasonable assurance that the intended function of cables and connections used in instrumentation circuits with sensitive, low-level signals that are not subject to the environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by heat, radiation, or moisture are maintained consistent with the current licensing basis through the period of extended operation. In most areas, the actual ambient environments (e.g., temperature, radiation, or moisture) are less severe than the plant design environment for those areas.

Calibration surveillance tests are used to manage the aging of the cable insulation and connections so that instrumentation circuits perform their intended functions. When an instrumentation channel is found to be out of calibration during routine surveillance testing, troubleshooting is performed on the loop, including the instrumentation cable and connections. A review of calibration results will be completed prior to the period of extended operation and every 10 years thereafter.

A1.26 INACCESSIBLE MEDIUM VOLTAGE CABLES NOT SUBJECT TO 10 CFR 50.49 ENVIRONMENTAL QUALIFICATION REQUIREMENTS

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements program manages the aging effects of inaccessible medium voltage cables within the scope of license renewal exposed to adverse localized environments caused by significant moisture simultaneously with significant voltage.

All cable manholes that contain in-scope Non-EQ inaccessible medium voltage cables will be inspected for water collection. Collected water will be removed as required. This inspection and water removal will be performed based on actual plant experience with the inspection frequency being at least once every two years.

The program provides for testing of in-scope Non-EQ inaccessible medium voltage cables to provide an indication of the conductor insulation condition. At least once every ten years, a polarization index test as described in EPRI TR-103834-P1-2 or other testing that is state-of-the-art at the time of the testing is performed.

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements program is a new program that will be implemented prior to the period of extended operation.

A1.27 ASME SECTION XI, SUBSECTION IWE

The ASME Section XI, Subsection IWE containment inservice inspection program provides aging management of the steel liner of the concrete containment building, including the containment liner plate, piping and electrical penetrations, access hatches, and the fuel transfer tube. Inspections are performed to identify and manage any containment liner aging effects that could result in loss of intended function. Acceptance criteria for components subject to Subsection IWE exam requirements are specified in Article IWE-3000. In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS CISI Program is updated during each successive 120-month inspection interval to comply with the requirements of the latest edition and addenda of the Code specified twelve months before the start of the inspection interval.

A1.28 ASME SECTION XI, SUBSECTION IWL

The ASME Section XI, Subsection IWL containment inservice inspection program manages aging of the concrete containment structure (including the tendon gallery ceiling), the concrete dome, and the post-tensioning system. Inspections are performed to identify and manage any containment concrete aging effects that could result in loss of intended function. In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS ISI Program is updated during each successive 120-month inspection interval to comply with the requirements of the latest edition and addenda of the Code specified twelve months before the start of the inspection interval.

Prior to the period of extended operation, procedures will be enhanced to include two new provisions regarding inspection of repair/replacement activities.

A1.29 ASME SECTION XI, SUBSECTION IWF

The ASME Section XI, Subsection IWF program manages aging effects that could result in loss of intended function for Class 1, 2 and 3 component supports. There are no Class MC supports at WCGS. In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS ISI Program is updated during each successive 120-month inspection interval to comply with the requirements of the latest edition and addenda of the Code specified twelve months before the start of the inspection interval.

A1.30 10 CFR 50, APPENDIX J

The 10 CFR Part 50, Appendix J program monitors leakage rates through the containment pressure boundary, including the penetrations and access openings, in order to detect degradation of containment pressure boundary. Seals, gaskets, and bolted connections are also monitored under the program.

Containment leak rate tests are performed in accordance with 10 CFR 50 Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors" Option B; Regulatory Guide 1.163, Revision 0, "Performance-Based Containment Leak-Testing Program," NEI 94-01, Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50 Appendix J; and ANSI/ANS 56.8, "Containment System Leakage Testing Requirements."

Containment leak rate tests are performed to assure that leakage through the primary containment, and systems and components penetrating primary containment does not exceed allowable leakage limits specified in the Technical Specifications. Corrective actions are taken if leakage rates exceed established administrative limits for individual penetrations or the overall containment pressure boundary.

A1.31 MASONRY WALL PROGRAM

The Masonry Wall Program, which is part of the Structures Monitoring Program, manages aging of masonry walls, and structural steel restraint systems of the masonry walls, within scope of license renewal based on guidance provided in IE Bulletin 80-11, "Masonry Wall Design" and NRC Information Notice 87-67, "Lessons Learned from Regional Inspections of Licensee Actions in Response to NRC IE Bulletin 80-11." The Masonry Wall Program contains inspection guidelines and lists attributes that cause aging of masonry walls, which are to be monitored during structural monitoring inspections, as well as establishes examination criteria, evaluation requirements, and acceptance criteria.

Prior to the period of extended operation, procedures will be enhanced to identify unreinforced masonry in the radwaste building within the scope of license renewal that requires aging management.

A1.32 STRUCTURES MONITORING PROGRAM

The Structures Monitoring Program manages the cracking, loss of material, and change in material properties by monitoring the condition of structures and structural supports that are within the scope of license renewal. The Structures Monitoring Program implements the requirements of 10 CFR 50.65 and is consistent with the guidance of NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2.

The Structures Monitoring Program provides inspection guidelines and walkdown checklists for concrete elements, structural steel, masonry walls, treated wood, structural features (e.g., caulking, sealants, roofs, etc.), structural supports, and miscellaneous components such as doors. The Structures Monitoring Program includes all masonry walls within the scope of license renewal. The Structures Monitoring Program also inspects supports for equipment, piping, conduit, cable tray, HVAC, and instrument components. The Structures Monitoring Program monitors groundwater for pH, sulfates, and chlorides.

Prior to the period of extended operation, procedures will be enhanced to add inspection parameters for treated wood and to monitor groundwater for pH, sulfates, and chlorides. Two samples of groundwater will be tested every five years.

A1.33 RG 1.127, INSPECTION OF WATER-CONTROL STRUCTURES ASSOCIATED WITH NUCLEAR POWER PLANTS

The Regulatory Guide 1.127, Inspection of Water Control Structures Associated with Nuclear Power Plants program manages aging due to extreme environmental conditions and the effects of natural phenomena that may affect water-control structures. WCGS meets the recommendations of Regulatory Guide 1.127, Revision 1.

This program includes inspection and surveillance activities for dams, slopes, canals, and other water-control structures associated with emergency cooling water systems or flood protection.

The program includes periodic visual inspections of in-scope concrete structures, periodic monitoring of the hydraulic and structural condition of the Ultimate Heat Sink (UHS), as well as associated structures, main dam service spillway, and auxiliary spillway, periodic dredging of the UHS reservoir and channel connecting the reservoir to the essential service water pumphouse, and survey of the UHS dam for vertical movement.

Prior to the period of extended operation, procedures will be enhanced so that the main dam service spillway and the auxiliary spillway will be inspected in accordance with the same specification, to clarify the scope of inspections for the spillways, to add the 5 year inspection frequency for the main dam service spillway, and to add cavitation to the list of concrete aging effects for surfaces other than spillways.

A1.34 NICKEL ALLOY AGING MANAGEMENT PROGRAM

The Nickel Alloy Aging Management Program manages cracking due to primary water stress corrosion cracking in all plant locations that contain Alloy 600, with the exception of steam generator tubing (aging management of steam generator tubing is performed by the Steam Generator Tubing Integrity program (B2.1.8)). Aging management requirements for nickel alloy penetration nozzles welded to the upper reactor vessel closure head noted in the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors program (B2.1.5) are included here for review convenience. This includes reactor coolant system (RCS) pressure boundary, RCS non-pressure boundary, and ESF locations.

The Nickel Alloy Aging Management Program uses inspections, mitigation techniques, repair/replace activities and monitoring of operating experience to manage the aging of Alloy 600 at WCGS. Detection of indications is accomplished through a variety of examinations consistent with NRC Order EA-03-009, ASME Section XI Subsections IWB and IWC, EPRI Report 1010087 (MRP-139) issued under NEI 03-08 protocol, and commitments made in response to NRC Bulletin 2004-01. Mitigation techniques are implemented when appropriate to preemptively remove conditions that contribute to primary water stress corrosion cracking. Repair/replacement activities are performed to proactively remove or overlay Alloy 600 material, or as a corrective measure in response to an unacceptable flaw in the material. Mitigation and repair/replace activities are consistent with those detailed in MRP-139.

The Wolf Creek Nickel Alloy Aging Management Program will be supplemented with implementation of applicable (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines, and (3) participation in industry initiatives, such as owners group programs and the EPRI Materials Reliability Program, for managing aging effects associated with nickel alloys, (4) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor coolant system nickel alloy pressure boundary components to the NRC for review and approval,

Upon completion of these supplemental requirements, the WCGS Nickel Alloy Aging Management inspection plan will be submitted for NRC review and approval at least 24 months prior to entering the period of extended operation.

A1.35 REACTOR COOLANT SYSTEM SUPPLEMENT

Section 3.1 of NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," supplements the aging management programs for the reactor coolant system components with the following additional requirements.

WCNOC will:

A. Reactor Coolant System Nickel Alloy Pressure Boundary Components

Implement applicable (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines, (3) participate in the industry initiatives, such as owners group programs and the EPRI Materials Reliability Program, for managing aging effects associated with nickel alloys, (4) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor coolant system nickel alloy pressure boundary components to the NRC for review and approval, and

B. Rector Vessel Internals

(1) Participate in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor internals to the NRC for review and approval.

A1.36 ELECTRICAL CABLE CONNECTIONS NOT SUBJECT TO 10 CFR 50.49 ENVIRONMENTAL QUALIFICATION REQUIREMENTS

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program manages the effects of loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. A representative sample of electrical cable connections not subject to 10 CFR 50.49 environmental qualification requirements within the scope of license renewal is infrared thermography tested as part of the WCGS predictive maintenance. The sample is based upon application, circuit loading and environment. Infrared thermography testing is being performed at least once every 10 years.

Prior to the period of extended operation, the infrared thermography testing procedure will be enhanced to require an engineering evaluation when test acceptance criteria are not met. The evaluation will include identifying the extent of condition, the potential root cause for not meeting the test acceptance criteria, and the likelihood of recurrence.

A one-time inspection of a representative sample of low voltage low current or low load connections will be performed prior to the period of extended operation. The technical basis for the selected sample will be documented and based upon application (low voltage), circuit loading (low current or low load), and environment (plant indoor air and outdoor air). An engineering evaluation will be performed when test acceptance criteria are not met. The evaluation will include identifying the extent of condition, the potential root cause for not meeting the test acceptance criteria, the likelihood of recurrence and the need to expand the sample size and/or frequency of the inspection.

A2 SUMMARY DESCRIPTIONS OF TIME-LIMITED AGING ANALYSIS AGING MANAGEMENT PROGRAMS

A2.1 METAL FATIGUE OF REACTOR COOLANT PRESSURE BOUNDARY

The WCGS Metal Fatigue of the Reactor Coolant Pressure Boundary program ensures that actual plant experience remains bounded by the assumptions used in the design calculations, or that appropriate corrective measures maintain the design and licensing basis by other acceptable means. The more-recent fatigue monitoring results indicate that none of the design transients should occur more than the currently-specified number of times before the end of a 60-year period of extended operation, and that fatigue usage factors should remain below the code allowable limit of 1.0, including effects of the reactor coolant environment as described by NUREG/CR-6260.

Prior to the period of extended operation, the Metal Fatigue of Reactor Coolant Pressure Boundary program will be enhanced to include:

- A cycle count action limit and corrective actions. An action limit will be established that requires corrective action when the cycle count for any of the critical thermal and pressure transients is projected to reach a stated percentage of the design-specified number of cycles before the end of the next fuel cycle. If this action limit is reached, acceptable corrective actions include:

    1. Review of fatigue usage calculations
        - To determine whether the transient in question contributes significantly to CUF.
        - To identify the components and analyses that are affected by the transient in question.
        - To ensure that the analytical bases of the leak-before-break (LBB) fatigue crack propagation analysis and of the high-energy line break (HELB) locations are maintained.

    2. Evaluation of remaining margins on CUF based on cycle-based or stress-based CUF calculations using the WCGS fatigue management program software.

    3. Redefinition of the specified number of cycles (e.g., by reducing specified numbers of cycles for other transients and using the margin to increase the allowed number of cycles for the transient that is approaching its specified number of cycles).

- A cumulative fatigue usage action limit and corrective actions. An action limit will be established that requires corrective action when calculated CUF (from cycle-based or stress-based monitoring) for any monitored location is projected to reach 1.0 within the next 2 or 3 fuel cycles. If this action limit is reached acceptable corrective actions include:

  1. Determine whether the scope of the monitoring program must be enlarged to include additional affected reactor coolant pressure boundary locations. This determination will ensure that other locations do not approach design limits without an appropriate action.
  2. Enhance fatigue monitoring to confirm continued conformance to the code limit.
  3. Repair the component.
  4. Replace the component.
  5. Perform a more rigorous analysis of the component to demonstrate that the design code limit will not be exceeded.
  6. Modify plant operating practices to reduce the fatigue usage accumulation rate.
  7. Perform a flaw tolerance evaluation and impose component-specific inspections, under ASME Section XI Appendices A or C (or their successors), and obtain required approvals by the NRC.

  These corrective actions are equally applicable to the WCGS NUREG/CR-6260 locations described in Section A3.2.3, "Effects of the Reactor Coolant System Environment on Fatigue Life of Piping and Components," including consideration of the effects of the reactor coolant environment.

- 10 CFR 50 Appendix B procedural and record requirements.

A2.2 ENVIRONMENTAL QUALIFICATION (EQ) OF ELECTRICAL COMPONENTS

The Environmental Qualification (EQ) of Electrical Components program manages component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are to be refurbished or replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. The Environmental Qualification (EQ) of Electrical Components program is consistent with the requirements of 10 CFR 50.49, and the guidance of NUREG-0588, "Interim Staff Position on

Environmental Qualification of Safety-Related Electrical Equipment" and Regulatory Guide 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants", Revision 1 for maintaining qualification of equipment.

A2.3 CONCRETE CONTAINMENT TENDON PRESTRESS

The Concrete Containment Tendon Prestress program, within the WCGS Creek ASME Section XI Subsection IWL Program, manages the loss of tendon prestress in the post-tensioning system.

The WCGS post-tensioning system consists of inverted U-shaped tendons, extending up through the basemat, through the full height of the cylindrical walls and over the dome; and horizontal circumferential (hoop) tendons, at intervals from the basemat to about the 45-degree elevation of the dome. The basemat is conventionally reinforced. The tendons are ungrouted, in grease-filled glands.

Prior to the period of extended operation, procedures will be revised to extend the list of surveillance tendons to include random samples for the 40, 45, 50, and 55 year surveillances, to explicitly require a regression analysis for each tendon group after every surveillance; and to invoke and describe regression analysis methods used to construct the lift-off trend lines. Surveillance program predicted force lines for the vertical and hoop tendon groups will be extended to 60 years. Procedure descriptions of acceptance criteria action levels will be revised to conform to the ASME Code, Subsection IWL 3221 descriptions.

Wolf Creek Generating Station (WCGS) License Renewal Application (LRA) Amendment Appendix B

B2.1.1 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD

Program Description

ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD inspections are performed to manage cracking, surface and subsurface discontinuities, loss of fracture toughness, loss of material, and physical damage in Class 1, 2, and 3 piping and components within the scope of license renewal. The program includes periodic visual, surface, volumetric examinations and leakage tests of Class 1, 2 and 3 pressure-retaining components, including welds, pump casings, valve bodies, integral attachments, and pressure-retaining bolting. WCGS inspections meet ASME Section XI requirements. The WCGS ISI Program is in accordance with 10 CFR 50.55a and ASME Section XI, 1998 edition through 2000 addenda.

In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS ISI Program is updated each successive 120 month inspection interval to comply with the requirements of the latest edition of the ASME Code specified twelve months before the start of the inspection interval.

NUREG-1801 Consistency

The ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD program is an existing program that is consistent, with exceptions, with NUREG-1801, Section XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD."

Exceptions to NUREG-1801

Program Elements Affected

Scope of Program – Element 1, Parameters Monitored or Inspected – Element 3, Detection of Aging Effects – Element 4, Monitoring and Trending –Element 5, Acceptance Criteria – Element 6, and Corrective Actions - Element 7

NUREG-1801, Section XI.M1, "ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD" specifies the use of ASME Section XI, 2001 edition through 2002 and 2003 addenda. WCGS third interval ISI Program uses ASME Code, 1998 Edition through the 2000 addenda. The use of the 1998 version of the ASME Code through 2000 addenda is consistent with provisions in 10 CFR 50.55a to use the Code in effect 12 months prior to the start of the inspection interval. WCGS will use the ASME Code Edition consistent with the provisions of 10 CFR 50.55a during the period of extended operation.

Enhancements

None

Operating Experience

Review of WCGS plant-specific operating experience for the WCGS ISI Program has not revealed any implementation issues with the ASME Section XI ISI Program.

The WCGS ISI Program is updated to account for industry operating experience. ASME Section XI is also revised every three years and addenda issued in the interim, which allows the code to be updated to reflect industry operating experience. The requirement to update the ISI Program to reference more recent editions of ASME Section XI at the end of each inspection interval ensures the ISI Program reflects enhancements due to operating experience that have been incorporated into ASME Section XI.

Conclusion

The continued implementation of the ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD aging management program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.2 Water Chemistry

Program Description

The Water Chemistry program includes maintenance of the chemical environment in the reactor coolant system and related auxiliary systems containing treated borated water and includes maintenance of the chemical environment in the steam generator secondary side and the secondary cycle systems to limit aging effects associated with corrosion mechanisms and stress corrosion cracking. The Water Chemistry program is consistent with the guidelines of EPRI TR-105714 Revision 5 "PWR Primary Water Chemistry Guidelines," and specific actions for exceeding the Technical Requirements Manual limits of fluorides, chlorides and dissolved oxygen. The Water Chemistry program is consistent with Revision 6 of the EPRI Pressurized Water Reactor Secondary Water Chemistry Guidelines (TR-1008224).

The methods used to manage both the primary and secondary chemical environments rely on the principles of (1) limiting the concentration of chemical species known to cause corrosion and (2) addition of chemical species known to inhibit degradation by their influence on pH and dissolved oxygen levels. Water chemistry control is most effective in areas of high flow where thorough mixing takes place and the monitoring samples are representative of actual conditions. For low flow areas and stagnant portions of the systems, sampling may not be as effective in determining local environmental conditions, and a one-time inspection of a representative group of components will provide verification of the effectiveness of the Water Chemistry program (refer to Section B2.1.16 "One-Time Inspection.")

NUREG-1801 Consistency

The Water Chemistry program is an existing program that is consistent, with exception, to NUREG-1801, Section XI.M2, "Water Chemistry."

Exceptions to NUREG-1801

<u>Program Elements Affected</u>

Scope of Program (Element 1)

When in wet layup conditions WCGS is meeting the requirements for mixing of the steam generator bulk solution. This ensures the chemistry of the bulk fluid is uniform and that samples are representative of the bulk steam generator secondary side water. The WCGS design incorporates pumps for periodic recirculation of the steam generator fluid in wet layup conditions. Operating experience has shown that a 33 hour recirculation period will provide adequate bulk mixing. If sample results after 33 hours of recirculation indicated a failure to meet the layup specifications, corrective action is taken to correct the layup mixture. After any chemical additions necessary to adjust chemistry, the steam generator is recirculated for another 33 hours prior to sampling. The intent of the EPRI Secondary Water Chemistry Guidelines for mixing is met after 33 hours of recirculation. Three samples per week are not necessary to demonstrate adequate mixing.

Enhancements

None

Operating Experience

The primary and secondary water chemistry control programs for WCGS have been developed in accordance with the EPRI Primary and Secondary Water Chemistry Control Guidelines, and therefore, benefit from the industry operating experience available when the EPRI guidelines were issued. The WCGS Strategic Primary Water Chemistry Plan incorporates nine specific topics of WCGS primary chemistry operating history into the top level document setting the primary chemistry control strategy. The Strategic Secondary Water Chemistry Plan incorporates WCGS secondary chemistry operating history regarding iron transport reduction, condenser integrity and dissolved oxygen control into the top level document setting the secondary chemistry control strategy.

Conclusion

The continued implementation of the Water Chemistry program, supplemented by the One-Time Inspection program (B2.1.16), provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

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The methods used to manage both the primary and secondary chemical environments rely on the principles of (1) limiting the concentration of chemical species known to cause corrosion and (2) addition of chemical species known to inhibit degradation by their influence on pH and dissolved oxygen levels. Water chemistry control is most effective in areas of high flow where thorough mixing takes place and the monitoring samples are representative of actual conditions. For low flow areas and stagnant portions of the systems, sampling may not be as effective in determining local environmental conditions, and a one-time inspection of a representative group of components will provide verification of the effectiveness of the Water Chemistry program (refer to Section B2.1.16 "One-Time Inspection.")

NUREG-1801 Consistency

The Water Chemistry program is an existing program that is consistent, with exception, to NUREG-1801, Section XI.M2, "Water Chemistry."

Exceptions to NUREG-1801

<u>Program Elements Affected</u>

Scope of Program (Element 1)

When in wet layup conditions WCGS is meeting the requirements for mixing of the steam generator bulk solution. This ensures the chemistry of the bulk fluid is uniform and that samples are representative of the bulk steam generator secondary side water. The WCGS design incorporates pumps for periodic recirculation of the steam generator fluid in wet layup conditions. Operating experience has shown that a 33 hour recirculation period will provide adequate bulk mixing. If sample results after 33 hours of recirculation indicated a failure to meet the layup specifications, corrective action is taken to correct the layup mixture. After any chemical additions necessary to adjust chemistry, the steam generator is recirculated for another 33 hours prior to sampling. The intent of the EPRI Secondary Water Chemistry Guidelines for mixing is met after 33 hours of recirculation. Three samples per week are not necessary to demonstrate adequate mixing.

Enhancements

None

Operating Experience

The primary and secondary water chemistry control programs for WCGS have been developed in accordance with the EPRI Primary and Secondary Water Chemistry Control Guidelines, and therefore, benefit from the industry operating experience available when the EPRI guidelines were issued. The WCGS Strategic Primary Water Chemistry Plan incorporates nine specific topics of WCGS primary chemistry operating history into the top level document setting the primary chemistry control strategy. The Strategic Secondary Water Chemistry Plan incorporates WCGS secondary chemistry operating history regarding iron transport reduction, condenser integrity and dissolved oxygen control into the top level document setting the secondary chemistry control strategy.

Conclusion

The continued implementation of the Water Chemistry program, supplemented by the One-Time Inspection program (B2.1.16), provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.10 Closed-Cycle Cooling Water System

Program Description

The Closed-Cycle Cooling Water System program manages loss of material, cracking, and reduction of heat transfer for components in closed-cycle cooling water systems. The program includes maintenance of system corrosion inhibitor concentrations within specified limits of EPRI TR-107396 to minimize aging, and periodic testing and inspections to evaluate system and component performance. Inspection methods include visual, ultrasonic testing (UT) and eddy current testing (ECT).

For the component cooling water system, the program maintains water chemistry within the parameters specified in plant procedures in order to minimize corrosion and microbiological growth through the addition of corrosion inhibitors and biocides. Diagnostic chemistry parameters are monitored to maintain the water within specified parameters and provide indication of abnormal conditions. Performance of selected heat exchangers is monitored by performing surveillance testing to verify the thermal or hydraulic performance function. The system pumps are also tested to verify performance. Nondestructive examinations are used to verify the pressure boundary intended function of system components is maintained. The program requires system pressure tests to locate and identify leaks so that corrective actions can be taken.

For the emergency diesel engine cooling water subsystem, plant heating system, and central chilled water system, the program relies on mitigative measures to minimize corrosion and microbiological growth through the use and maintenance of corrosion inhibitors and biocides. Chemistry parameters are also monitored to provide indication of abnormal conditions and preclude cracking in stainless steels in the plant heating system. Emergency diesel generator engine performance parameters are monitored through periodic surveillance tests. The plant heating and central chilled water systems are within the scope of license renewal for spatial interaction concerns only, therefore, the periodic sampling and maintenance of system chemistry in accordance with the specified limits is adequate to ensure component intended functions are maintained.

NUREG-1801 Consistency

The Closed-Cycle Cooling Water System program is an existing program that, following enhancement, will be consistent with exception to NUREG-1801, Section XI.M21, "Closed-Cycle Cooling Water."

Exceptions to NUREG-1801

<u>Program Elements Affected</u>

Parameters Monitored or Inspected - Element 3

NUREG-1801, Section XI.M21 states this program should monitor heat exchanger parameters including flow, inlet and outlet temperatures, and differential pressure. The letdown heat exchangers, residual heat removal heat exchangers, safety injection pump coolers, and the PASS sample coolers, are not periodically tested for flow, inlet and outlet temperatures, and differential pressure. The CCW heat exchangers are periodically tested to measure heat transfer capability. Shell-side (closed-cycle cooling water) flow and temperature measurements are used to calculate heat exchanger performance in terms of a fouling factor. Tube side (raw water) flow and differential pressure are also measured and used as an indicator of tube fouling. The CCW heat exchangers are periodically NDE tested (ECT) to detect aging of the tube pressure boundary. The performance monitoring and NDE of the CCW heat exchangers will provide a leading indicator for aging of the other CCW supplied heat exchangers. An enhancement to the WCGS closed-cycle cooling water system program to specify inspection of the internal surfaces of the CCW pump return line check valves during operational readiness inspection activities will also provide additional indicators of the effective aging management of loss of material and fouling in the CCW system. A review of WCGS plant specific operating experience indicates there has been no evidence of significant fouling or loss of material observed in the closed cooling water systems. In lieu of performance testing of all CCW supplied heat exchangers, the CCW heat exchanger performance monitoring, system internal inspections activities, and CCW chemistry program are used to manage aging effects in the CCW system.

Parameters Monitored or Inspected - Element 3, Detection of Aging Effects – Element 4, Monitoring and Trending – Element 5, and Acceptance Criteria – Element 6

WCGS will not perform inspection or testing of plant heating and central chilled water systems. Plant heating and central chilled water systems are in the scope of license renewal due to 10 CFR 54.4(a)(2) due to special interactions only. Therefore, the only intended function applicable to these systems is pressure boundary. Crud buildup would not directly affect the intended function of these components. The periodic sampling and maintenance of system chemistry within specified limits is adequate to manage aging before loss of intended function.

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program element:

Detection of Aging Effects – Element 4

Visual inspection procedures used for identification of stress corrosion cracking (SCC) will be enhanced to define cracking, provide additional guidance for detection of cracking and identify specific acceptance criteria relating to "as-found" cracking.

Monitoring and Trending - Element 5

A new periodic preventive maintenance activity will be developed to specify performing inspections of the internal surfaces of the valve bodies and accessible piping while the valves are disassembled for operational readiness inspections to detect loss of material and fouling. The acceptance criteria will be specified in this preventive maintenance activity.

Operating Experience

WCGS has identified biological activity and resulting deposit build-up in the closed-cycle cooling water systems. Corrective actions included implementation of periodic monitoring for biological activity and the addition of biocides when an increasing trend of biological activity is detected. There has been no evidence of significant fouling or corrosion product build-up observed in the closed-cycle cooling water systems.

In 1994, WCGS observed through-wall leakage at welds in the closed-cycle cooling water return line. Subsequent UT inspections revealed linear indications in multiple welds in this section of closed-cycle cooling water piping. It was determined the through wall leaks were caused by intergranular stress corrosion cracking (IGSCC). All welds identified to have cracking were replaced.

Detection of additional through-wall leaks on the letdown heat exchanger and discharge line from the heat exchangers occurred in 2000, which prompted an expanded scope of UT inspections of the heat exchanger and the discharge line, as well as several welds on the inlet line. Results of the UT inspections indicated additional linear indications at welds that were localized to the letdown heat exchanger discharge piping. Several welds on the return header were inspected with no recordable indications.

Based on the results of the UT examinations, repair plans were developed to replace all welds with rejectable indications. Piping was replaced as necessary to facilitate fieldwork and to limit radiation exposure. Welds inside the heat exchanger room were not inspected due to dose rates, however, all these welds/piping were replaced.

A selected number of welds in the letdown heat exchanger discharge piping exhibiting rejectable linear indications were preserved and sent for independent hardware failure and root cause analysis. During the subsequent refueling outage, additional piping was inspected using UT examinations to identify any existing indications in the reactor coolant pumps thermal barrier, motor air cooler, and upper bearing cooler closed-cycle cooling water system return lines. The UT examinations resulted in what appeared to be severe, rejectable indications. Based on the previous root cause investigation of the letdown heat exchanger discharge line indications, and the similarity to the indications identified in refueling outage 11, it was believed that these indications were also the result of stress corrosion cracking. A replacement plan was developed to repair/replace welds and piping during refueling outage 12.

Following the identification of the rejectable indications in the reactor coolant pump closed-cycle cooling water return piping in refueling outage 12, two indications that extended the full circumference of the pipe were partially sized by UT for depth. The depth sizing indicated that the indications extended to 90 percent through wall over large fractions of their length. The NRC contracted the Naval Surface Warfare Center (NSWC) to perform a hardware failure analysis. WCGS also contracted a hardware failure analysis (with the hardware examination performed by Atomic Energy of Canada Limited (AECL)) and a root cause analysis. WCGS provided weld and pipe samples that were removed from the system piping with the most severe noted indications to the NRC and AECL for examination. The NSWC and AECL independently performed destructive and non-destructive examinations of the provided piping specimens. The final reports from both organizations were provided to the NRC and WCGS for review. The investigations performed by AECL revealed no significant stress corrosion cracking in the circumferential direction; however, small amounts of stress corrosion cracking in the longitudinal direction were found. The deterioration was limited to a few very small areas and was characterized as intergranular attack. No cracking was observed in the analyses performed by the NSWC.

Since the AECL and NSWC reports concluded no significant stress corrosion cracking was identified in the subject piping and welds, WCGS contracted EPRI to investigate the discrepancy between the hardware failure analyses and the UT results. The EPRI report concluded the NDE procedure was not strictly followed with respect to the removal of external weld reinforcement, acquisition of internal and external surface contours, recording of indication location, or plotting of indications on a cross-sectional drawing of the component. EPRI felt that procedural enhancements could be made by the inclusion of flaw discrimination techniques.

Based on the conclusions and recommendations of the various reports and analyses performed regarding cracking of WCGS closed-cycle cooling water system piping, corrective actions have included:

- Adjusting of the pH and molybdate to the higher levels recommended in the EPRI Closed Cooling Water Chemistry Guidelines (TR-107396).
- Implementation of monitoring for biological activity and the addition of biocides to the closed-cycle cooling systems.
- Susceptible welds in the CCW return line from the letdown heat exchanger (including the heat exchanger) have been replaced and stress relieved.
- Plant specific UT inspection procedures were revised to incorporate EPRI recommendations.

Periodic UT examinations have been established over the course of the next several refueling outages, of welds in the discharge line from the letdown heat exchanger to verify the effectiveness of the corrective actions. The UT inspections of the piping will be an adequate representation of the affects of corrective actions on the heat exchanger.

In a letter providing an evaluation of cracking in closed-cycle cooling water system piping at WCGS, the NRC has concluded that, based on the information provided by WCGS and the work of the NRC contractor, WCGS has taken sufficient corrective action and no additional action is required.

Conclusion

The continued implementation of the Closed-Cycle Cooling Water program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.12 Fire Protection

Program Description

The Fire Protection program manages loss of material for fire rated doors, fire dampers, diesel-driven fire pump, and the halon fire suppression system, cracking, spalling, and loss of material for fire barrier walls, ceilings, and floors, hardness and shrinkage due to weathering of fire barrier penetration seals, and hardness – loss of strength for halon fire suppression system flexible hoses. Periodic visual inspections of fire barrier penetration seals, fire dampers, fire barrier walls, ceilings and floors, and periodic visual inspections and functional tests of fire-rated doors are performed. The internal surface of the diesel-driven fire pump fuel oil supply line is managed by the Fuel Oil Chemistry program (B1.14), which utilizes the One-Time Inspection program (B1.16) to verify the effectiveness of the Fuel Oil Chemistry program using a representative sample of components in systems that contain fuel oil, ensuring that there is no loss of function due to aging of the fuel oil supply line.

The Fire Protection program performs a visual inspection, at least once every 18 months, of the fire barrier walls, ceilings, and floors, including coating and wraps (structural steel fireproofing, raceway fire wrap and hatch covers), examining for any signs of aging such as cracking, spalling, and loss of material.

Approximately 10 percent of each type (electrical and mechanical as practical) of penetration seal is visually inspected at least once every 18 months.

The Fire Protection program performs drop tests on approximately 10 percent of accessible horizontal and vertical fire dampers on an 18 month basis. Fire dampers that are inaccessible for drop testing are visually inspected to assess integrity/availability. The fire damper inspection and drop test procedure also performs a visual inspection on fire dampers which have transfer grilles, with no or limited ductwork, on both sides of safety significant fire barriers.

The Fire Protection program performs a visual inspection, at least once per year, on fire-rated doors to verify the integrity of door surfaces and for clearances to detect aging of the fire doors. The internal surface of the diesel-driven fire pump fuel oil supply line is managed by the Fuel Oil Chemistry program (B1.14), which utilizes the One-Time Inspection program (B1.16) to verify the effectiveness of the Fuel Oil Chemistry program using a representative sample of components in systems that contain fuel oil, ensuring that there is no loss of function due to aging of the fuel oil supply line. A visual inspection and function test of the halon fire suppression system is performed every 18 months.

NUREG-1801 Consistency

The Fire Protection program is an existing program that, following enhancement, will be consistent with exception to NUREG-1801, Section XI.M26, "Fire Protection."

Exceptions to NUREG-1801

Program Elements Affected

Parameters Monitored or Inspected - Element 3 and Detection of Aging Effects – Element 4

WCGS performs visual inspections and function tests of the halon system every 18 months, not every 6 months as suggested by NUREG-1801, Section XI.M26. The 18 month inspection frequency is specified in the WCGS fire protection program, which is referenced in the USAR, and was part of the original licensing basis until the fire protection requirements were removed from the Technical Specifications and placed in plant procedures.

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

Scope of Program – Element 1, Parameters Monitored or Inspected – Element 3, Detection of Aging Effects – Element 4, Monitoring and Trending –Element 5, and Acceptance Criteria – Element 6

Fire damper inspection and drop test procedures will be enhanced to inspect damper housing for signs of corrosion.

Fire barrier and fire door inspection procedures will be enhanced to specify fire barriers and doors described in USAR Appendix 9.5A, "WCGS Fire Protection Comparison to APCSB 9.5-1 Appendix A," and WCGS Fire Hazards Analysis.

Training for technicians performing the fire door and fire damper visual inspections will be enhanced to include fire protection inspection requirements and training documentation.

Halon fire suppression system inspection procedures will be enhanced to include visual inspections of halon tank flexible hoses for hardening – loss of strength. Visual inspections are not required for flexible hoses that have a scheduled replacement interval.

Operating Experience

WCGS fire barrier penetration seals have been found with degradation during inspections. It was determined that the identified condition had existed since original construction. It was determined that the version of the procedure used for the inspection did not provide a detailed location of seismic gap. The procedure was revised to provide adequate guidance regarding seismic gap seal locations and correct wording to indicate that seismic gap seals are a portion of the fire area boundary required for operability. Seismic gap seals were inspected using the revised procedure and additional degraded seal segments repaired or captured in a corrective action document. The current revision of the fire barrier penetration seals inspection procedure has demonstrated degradation of fire barrier penetration seals will be detected prior to loss of the intended function.

Cracking due to water damage on Thermo-Lag of an electrical race way and on a containment buttress hatch cover was found and was identified by the fire barrier inspection before the loss of intended function. The Thermo-Lag observed to have cracking on the electrical race way did not have a credited fire-rating, it only provides IEEE-384 electrical separation.

The WCGS fire door inspections have identified wear of hinges and handles prior to the doors' loss of intended function and initiated appropriate corrective actions.

Through the course of reviewing fire barrier penetration seal parameters and documenting qualification consistent with NRC Information Notice 88-04, several penetration seals required field action to ensure that a fire barrier configuration was maintained. An action plan has been developed to track field work to completion and ensure that documents affected by this change package are released prior to change package closeout.

WCGS performed a Fire Protection Program Self Assessment examining penetration seals for installation compliance regarding approved installation details and bounding test parameters. As a result of this self assessment, unbounded penetration seal conditions were identified and have been reviewed and evaluated for acceptance and/or functionality. The initial evaluation was formulated to demonstrate that the function of the penetration seals identified to be unbounded provide a level of protection that is commensurate with the combustible loading within the fire areas where these seals are located. All penetrations that were identified to have unbounded seal conditions have been repaired or evaluated in accordance with Generic Letter 86-10 guidance and no further action is required.

Conclusion

The continued implementation of the Fire Protection program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.14 Fuel Oil Chemistry

Program Description

The Fuel Oil Chemistry program manages loss of material on the internal surface of components in the emergency diesel fuel oil storage and transfer system and diesel fire pump fuel oil system. The program includes (a) surveillance and monitoring procedures for maintaining fuel oil quality by controlling contaminants in accordance with applicable ASTM Standards, (b) periodic draining of water from fuel oil tanks, (c) visual inspection of internal surfaces during periodic draining and cleaning of fuel oil tanks in the emergency diesel fuel oil storage and transfer system, (d) ultrasonic wall thickness measurements of the emergency fuel oil storage tanks if there are indications of reduced cross sectional thickness found during the visual inspection, (e) one-time ultrasonic (UT) or pulsed eddy current (PEC) thickness examination on the external surface of the diesel fire pump fuel oil tank, (f) inspection of new fuel oil before it is introduced into the storage tanks, and (g) one-time inspections of a representative sample of components in systems that contain fuel oil by the One-Time Inspection program (B2.1.16).

Fuel oil quality is maintained by monitoring and controlling fuel oil contaminants in accordance with applicable ASTM Standards. This is accomplished by periodic sampling and chemical analysis of the fuel oil inventory at the plant and sampling, testing, and analysis of new fuel oil prior to delivery at the plant. If a sample appears to be unsatisfactory, delivery is discontinued or not allowed.

All samples are taken in accordance with ASTM D4057 and are shipped to a laboratory approved in accordance with the WCGS QA program for analysis.

Any accumulated water is removed monthly from the emergency fuel oil storage and emergency fuel oil day tanks, and quarterly from the diesel fire pump fuel tank.

The internal surfaces of the emergency fuel oil storage tanks are periodically drained, cleaned, and visually inspected to detect potential aging. The emergency fuel oil day tanks will also be drained, cleaned, and visually inspected at the same time as the emergency fuel oil storage tanks. The diesel fire pump fuel tank does not have interior accessibility for cleaning.

Due to the emergency fuel oil day tanks periodic sampling and testing for water and sediment, and having no history in the last ten years of having more than trace amounts of water found during sampling, no ultrasonic thickness measurements will be performed on the emergency fuel oil day tanks.

A representative sample of components in systems that contain fuel oil will be inspected for evidence of aging effects in accordance with One-Time Inspection program (B2.1.16).

NUREG-1801 Consistency

The Fuel Oil Chemistry program is an existing program that, following enhancement, will be consistent with exceptions to NUREG-1801, Section XI.M30, "Fuel Oil Chemistry."

Exceptions to NUREG-1801

Program Elements Affected

Preventive Actions (Element 2)

WCGS does not add fuel oil stabilizers, corrosion inhibitors, or routinely add biocides. It relies on the periodic sampling and analysis for particulates and corrosion products. Any accumulated water is removed monthly from the emergency fuel oil storage and emergency fuel oil day tanks and quarterly from the diesel fire pump fuel tank.

Parameters Monitored or Inspected (Element 3) and Acceptance Criteria (Element 6)

WCGS uses only ASTM Standard D1796-83, not D1796 and D2709. WCGS Technical Specifications commit to using only D1796-83. The testing conducted using ASTM D1796 gives quantitative results, whereas D2709 testing gives only pass-fail results; therefore, the D1796 method gives more descriptive information about the fuel oil condition than the D2709 method.

Detection of Aging Effects (Element 4)

The diesel fire pump fuel oil tank does not have interior accessibility for cleaning. Periodic sampling and testing for water and sediment has demonstrated that neither the emergency fuel oil day tanks or the diesel fire pump fuel oil tank have any history, within the last ten years, of water or sediment exceeding the normal chemistry level. Periodic sampling, cleaning, and visual inspection of the emergency fuel oil day tanks will act as a representative sample and ensure that significant aging is not occurring in the diesel fire pump fuel oil tanks. A one-time ultrasonic (UT) or pulsed eddy current (PEC) thickness examination on the external surface of the diesel fire pump fuel oil tank will be performed to detect corrosion related wall-thinning.

Acceptance Criteria (Element 6)

WCGS uses the guidance of ASTM Standard D 2276 Method A for determination of particulates, as opposed to the combination of D 2276 and D 6217. ASTM D6217 states that it is the first ASTM standard test method for assessing the mass quantity of particulates in middle distillate fuels. Test Method D5452 and its predecessor Test Method D2276 were developed for aviation fuels and used 1 gal or 5 L of fuel sample. Using greater than or equal to one gallon of middle distillate fuel often requires significant time to complete the filtration. The D6217 test method uses about a quarter of the volume in the D2276 aviation fuel method. There is no indication that ASTM D6217 is either technically superior to D2276 as far as managing the effects of aging (it merely allows for faster filtration), or that the combination of the two standards adds any value beyond using just D2276 itself.

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

Preventive Actions - Element 2 and Detection of Aging Effects – Element 4

Procedures will be enhanced to provide for supplemental ultrasonic thickness measurements if there are indications of reduced cross sectional thickness found during the visual inspection of the emergency fuel oil storage tanks. The emergency fuel oil day tanks will be added to the 10 year drain, clean, and internal inspection program.

A one-time ultrasonic (UT) or pulsed eddy current (PEC) thickness examination on the external surface of the diesel fire pump fuel oil tank will be performed to detect corrosion related wall-thinning. The examination will be performed once between 10 and 2 years prior to the period of extended operation.

Operating Experience

A review of plant-specific operating experience indicates that both emergency fuel oil storage tanks have experienced high particulate counts. The fuel oil tanks are checked regularly for the presence of water and sediment and the emergency fuel oil storage tanks are regularly checked for particulates; any instances are corrected in a timely manner. Neither the emergency fuel oil day tanks nor the diesel fire pump fuel tanks have any history of water and sediment levels exceeding the normal chemistry level.

The internals of the emergency fuel oil storage tanks were visually inspected in 2002. This inspection revealed that the interior coating of one of the emergency fuel oil storage tanks was deteriorated and some rust had developed on the interior walls. An engineering evaluation determined that the failure of the interior coating should not result in failure of the diesel system to perform its intended functions. It was also determined that the rust identified during this inspection was an acceptable condition because it is not at a stage that could result in the component's failure to perform its intended function and any deteriorated conditions in future inspections will be documented in a corrective action. Upon the discovery of the condition of the emergency fuel oil storage tank interior coating, biocide was added to that tank and all of the diesel fuel oil in the emergency fuel oil storage tanks was subsequently replaced with new fuel oil. Since the discovery of the condition of the emergency fuel oil storage tank interior coating, one of the emergency fuel oil day tanks has been visually inspected, and no coating degradation was found. The other emergency fuel oil day tank is scheduled to be visually inspected by the end of 2006.

Conclusion

The continued implementation of the Fuel Oil Chemistry program, supplemented by the One-Time Inspection program (B2.1.16), provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.17 Selective Leaching of Materials

Program Description

The Selective Leaching of Materials program manages loss of material due to selective leaching for brass (>15% zinc) and gray cast iron components exposed to raw water, secondary water, or closed-cycle cooling water within the scope of license renewal. Components susceptible to selective leaching are in the fire protection system, the auxiliary steam system, the auxiliary building HVAC system, the containment purge HVAC system, the control building HVAC system, the fuel building HVAC system, the miscellaneous buildings HVAC system, the standby diesel engine system and the oily waste system. WCGS has no components made of bronze alloys that are susceptible to selective leaching.

The program includes a one-time inspection of a selected sample of component internal surfaces. Visual and mechanical methods determine whether loss of material due to selective leaching is occurring. If these inspections detect dezincification or graphitization, which are indications of selective leaching, then a follow up examination/evaluation will be performed. The examination/evaluation may require confirmation of selective leaching with a metallurgical evaluation (which may include a microstructure examination.) The sample size for the system, material, and environment combination may be expanded based upon the results of the evaluation and confirmatory testing. If indications of selective leaching are confirmed follow up examinations/evaluations will be performed.

The initial visual inspections/evaluations required by this program will be completed prior to the period of extended operation. If indications of selective leaching are confirmed, follow up examinations/evaluations are performed.

The Selective Leaching of Materials program is a new program and will be implemented prior to the period of extended operation.

NUREG-1801 Consistency

The Selective Leaching of Materials program is a new program that when implemented will be consistent with exceptions to NUREG-1801, Section XI.M33, "Selective Leaching of Materials."

Exceptions to NUREG-1801

<u>Program Elements Affected</u>

Scope of Program – Element 1, Preventive Actions – Element 2, Parameters Monitored or Inspected – Element 3, and Detection of Aging Effects – Element 4

A qualitative determination of selective leaching will be used in lieu of Brinell hardness testing for components within the scope of the Selective Leaching of Materials aging management program. The exception involves the use of examinations, other than Brinell hardness testing identified in NUREG-1801, Section XI.M33, to identify the presence of selective leaching of material. The exception is justified, because hardness testing may not be feasible for most components due to form and configuration (i.e., heat exchanger tubes) and other mechanical means, i.e., scraping, or chipping, provide an equally valid means of identification.

Enhancements

None

Operating Experience

The Selective Leaching of Materials program is a new program that is a one-time inspection with no operational history at WCGS.

During eddy current testing of the emergency diesel generator heat exchanger tubing at WCGS in 2001, several tubes were found to have defect indications originating on the tubing inside diameter. To support the root cause investigation of these indications, selected tubes were removed from the EDG heat exchangers and destructively examined. The laboratory examinations did not reveal any evidence of selective leaching, such as dezincification, in any of the tube sections.

Conclusion

The implementation of the Selective Leaching of Materials program will provide reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation

B2.1.19 One-Time Inspection of ASME Code Class 1 Small-Bore Piping

Program Description

The One-Time Inspection of ASME Code Class 1 Small-Bore Piping program manages cracking of stainless steel ASME Code Class 1 piping less than or equal to 4 inches. This program is a part of the WCGS Risk-Informed Inservice Inspection (RI-ISI) program.

For ASME Code Class 1 small-bore piping, the RI-ISI program requires volumetric examinations (by ultrasonic testing) on selected weld locations to detect cracking. Weld locations are selected based on the guidelines provided in EPRI TR-112657. Ultrasonic examinations are conducted in accordance with ASME Section XI with acceptance criteria from Paragraph IWB-3131 and IWB-2430. The fourth interval of the ISI program at WCGS will provide the results for the one time inspection of ASME Code Class 1 small-bore piping.

In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS ISI Program is updated each successive 120 month inspection interval to comply with the requirements of the latest edition of the ASME Code specified twelve months before the start of the inspection interval.

NUREG-1801 Consistency

The One-Time Inspection of ASME Code Class 1 Small-Bore Piping program is an existing program that is consistent with exception to NUREG-1801, Section XI.M35, "One-Time Inspection of ASME Code Class 1 Small-Bore Piping."

Exceptions to NUREG-1801

Program Elements Affected

Acceptance Criteria – Element 6

The WCGS ISI Program uses ASME Section XI 1998 Edition through 2000 addenda. NUREG-1801, Section XI.M35 specifies the use of ASME Section XI, 2001 edition with 2002 and 2003 addenda. There are no differences in the two code versions for Paragraphs IWB-3131 and IWB-2430.

WCGS will use the ASME Code Edition consistent with the provisions of 10CFR50.55a during the 10 year period prior to the period of extended operation (4th interval) and during the period of extended operation.

Enhancements

None

Operating Experience

WCGS has not experienced cracking of stainless steel ASME Code Class 1 piping less than or equal to NPS 4 and greater than or equal to NPS 1.

Conclusion

The continued implementation of the One-Time Inspection of ASME Code Class 1 Small-Bore Piping program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.21 Flux Thimble Tube Inspection

Program Description

The Flux Thimble Tube Inspection program performs wall thickness eddy current testing of all flux thimble tubes that form part of the reactor coolant system pressure boundary. The pressure boundary includes the length of the tube inside the reactor out to the seal fittings outside the reactor vessel. Eddy current testing is performed on the portion of the tubes inside the reactor vessel. The program implements the recommendations of NRC Bulletin 88-09, "Thimble Tube Thinning in Westinghouse Reactors."

During each outage, flux thimble tube wear is evaluated and inspections are performed based on evaluation results. Wall thickness measurements are trended and wear rates are calculated. If the predicted wear (as a measure of percent through wall) for a given flux thimble tube is projected to exceed the established acceptance criteria prior to the next outage, corrective actions are taken to reposition, cap or replace the tube. Program documentation maintains details regarding the core location, wear location and the number of times a tube has been previously repositioned or replaced.

NUREG-1801 Consistency

The Flux Thimble Tube Inspection program is an existing program that is consistent with NUREG-1801, Section XI.M37, "Flux Thimble Tube Inspection."

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

WCGS has inspected flux thimble tubes in accordance with NRC IE Bulletin 88-09, "Thimble Tube Wearing in Westinghouse Reactors." Details regarding the core location, wear location and the number of times a tube has been previously repositioned, capped or replaced are maintained. Prior to 2002, no thimble tubes were replaced. Since that time, eleven flux thimble tubes have been replaced. Ten of them were due to wear and were replaced with chrome plated tubes in identified wear areas which are more wear resistant. There have been no through-wall failures of flux thimble tubes resulting in a loss of reactor coolant pressure boundary.

Conclusion

The continued implementation of the Flux Thimble Tube Inspection program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.22 Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components

Program Description

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program manages cracking, fouling, loss of material and hardening - loss of strength. Fouling has not been identified as an aging effect in any component currently in-scope for this aging management program. Visual inspections of the internal surfaces of piping, piping components, ducting and other components that are not covered by other aging management programs are included in this program.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program uses the work control process to conduct and document inspections. The program performs visual inspections during periodic maintenance, predictive maintenance, surveillance testing and corrective maintenance to detect aging effects that could result in a loss of component intended function.

A review will be conducted to determine the number of inspection opportunities afforded by the work control process for all systems in the scope of license renewal. In the vast majority of cases, it is expected that the number of work opportunities existing will be sufficient to detect aging and provide reasonable assurance that intended functions are maintained. For those systems or components where inspections of opportunity are insufficient, an inspection will be conducted prior to the period of extended operation to provide reasonable assurance that the intended functions are maintained.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program is a new program that will be implemented prior to the period of extended operation.

NUREG-1801 Consistency

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program is a new program that, when implemented, will be consistent with NUREG-1801, Section XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components."

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program is a new program. Therefore no programmatic operating experience has been gained. The program will be reviewed to account for industry and station operating experience.

Conclusion

The implementation of the Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program will provide reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.28 ASME Section XI, Subsection IWL

Program Description

The ASME Section XI, Subsection IWL containment inservice inspection program provides aging management of the concrete containment structure (including the tendon gallery ceiling), the concrete dome, and the post-tensioning system. For the inspection interval from 1998 to 2008, WCGS performs concrete inspections in accordance with the 1998 Edition of ASME Section XI (with no addenda), Subsection IWL, supplemented with the applicable requirements of 10 CFR 50.55a(b)(2)(xiii). Additional commitments define the visual examinations to be performed as part of the WCGS program and the qualification requirements for personnel performing the inspections. Acceptance criteria for components subject to IWL examination requirements are specified in Article IWL-3000. With enhancements, the WCGS IWL CISI program is consistent with the 2001 edition of ASME Section XI, Subsection IWL, including the 2002 and 2003 Addenda, for each of the elements addressed in NUREG 1801, Section XI.S2, ASME Section XI, Subsection IWL.

In conformance with 10 CFR 50.55a(g)(4)(ii), the WCGS CISI Program is updated during each successive 120-month inspection interval to comply with the requirements of the latest edition and addenda of the Code specified twelve months before the start of the inspection interval.

NUREG-1801 Consistency

The ASME Section XI, Subsection IWL program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section XI.S2, ASME Section XI, Subsection IWL.

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancement will be implemented in the following program element:

Detection of Aging Effects - Element 4

The 2001 edition of ASME Section XI with 2002 and 2003 addenda, Subsection IWL, Article IWL-2000, includes two provisions regarding inspection of repair/replacement activities that are not required by the 1998 edition. IWL-2410(d) specifies additional inspections for concrete surface areas affected by a repair/replacement activity, and IWL-2521.2 specifies additional inspections for tendons affected by a repair/replacement activity. In accordance with 10 CFR 50.55a, WCGS will revise their ASME Section XI, Subsection IWL containment inservice inspection program prior to the next inspection interval to incorporate the ASME Code edition and addenda incorporated into 10 CFR 50.55a at that time.

Operating Experience

The results of the twentieth year surveillance report of the post-tensioning system (2005), which includes the inspection of the unbonded post-tensioning system (Examination Category L-B), and the visual examination of the WCGS containment concrete surfaces (Examination Category L-A), showed no abnormal degradation of the Post Tensioning System.

The results of the 2000 Physical In-Service Tendon Inspection of the containment building post tensioning system, included both the concrete surfaces (Examination Category L-A) and the unbonded post-tensioning system (Examination Category L-B) and concluded that the containment structure has experienced no abnormal degradation of the post-tensioning system.

A review of WCGS operating experience has shown no cases of unacceptable degradation of the concrete containment building or the post-tensioning system.

Conclusion

The continued implementation of the ASME Section XI, Subsection IWL program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.32 Structures Monitoring Program

Program Description

The Structures Monitoring Program manages the cracking, loss of material, and change in material properties by monitoring the condition of structures and structural supports that are within the scope of license renewal. The Structures Monitoring Program implements the requirements of 10 CFR 50.65 and is consistent with the guidance of NUMARC 93-01, Revision 2 and Regulatory Guide 1.160, Revision 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The Structures Monitoring Program provides inspection guidelines and walkdown checklists for concrete elements, structural steel, masonry walls, treated wood, structural features (e.g., caulking, sealants, roofs, etc.), structural supports, and miscellaneous components such as doors. The inspection methods, inspection frequency, and inspector qualifications are in accordance with WCGS procedures, which reference ACI 349.3R-96, ASCE 11-90, and ACI 201.1R-92.

The Structures Monitoring Program includes all masonry walls within the scope of license renewal. The Structures Monitoring Program also inspects supports for equipment, piping, conduit, cable tray, HVAC, and instrument components. The Structures Monitoring Program monitors groundwater for pH, sulfates, and chlorides. Two samples of groundwater are tested every five years.

Though coatings may have been applied to the external surfaces of structural members, no credit was taken for these coatings in the determination of aging effects for the underlying materials. The Structures Monitoring Program evaluates the condition of the coatings as an indication of the condition of the underlying materials.

NUREG-1801 Consistency

The Structures Monitoring Program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section XI.S6, "Structures Monitoring Program."

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancement will be implemented in the following program element:

Parameters Monitored or Inspected - Element 3

Procedures will be enhanced to add inspection parameters for treated wood.

The Structures Monitoring Program will be enhanced to monitor groundwater for pH, sulfates, and chlorides. Two samples of groundwater will be tested every five years.

Operating Experience

The baseline walkdown inspection for the Structures Monitoring Program occurred in 1998. The results of this inspection were primarily categorized as Acceptable with Minor Degradation. All items found to have more severe aging effects were categorized as Acceptable with Degradation and have been reexamined and evaluated for further action. There were no items identified that required a categorization of Major Degradation.

During the five year reinspection in 2002/2003, four items were identified to have increased degradation. Two of those items previously categorized as Acceptable with Degradation are not within the scope of license renewal. Two items that were previously categorized as Acceptable with Minor Degradation were noted to have increased degradation and reclassified to Acceptable with Degradation. One was corrosion on an essential service water hanger in the communications corridor, and the other was corrosion on a steel column in the turbine building. Corrective action has been initiated. Five new items categorized as Acceptable with Degradation were reported during the 2002/2003 inspection. None of these items required immediate action to maintain their intended functions and all will be monitored for future changes.

Conclusion

The continued implementation of the Structures Monitoring Program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.34 Nickel Alloy Aging Management Program

Program Description

The plant specific Nickel Alloy Aging Management Program manages cracking due to primary water stress corrosion cracking in all plant locations that contain Alloy 600, with the exception of steam generator tubing (aging management of steam generator tubing is performed by the Steam Generator Tubing Integrity aging management program (B2.1.8)). This includes reactor coolant system (RCS) pressure boundary, RCS non-pressure boundary, and ESF locations. Aging management requirements for nickel alloy penetration nozzles welded to the upper reactor vessel closure head noted in the Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors program (B2.1.5) are included here for review convenience. The term Alloy 600 is used throughout this program to represent Nickel Alloy 600 material and Nickel Alloy 82/182 weld metal. Non-Alloy 600 nickel components (e.g., steam generator bowl drain welds made of Alloy 52/152) are not included in this program but are subject to the ASME Section XI Inservice Inspection program (B2.1.1) requirements.

The Nickel Alloy Aging Management Program uses inspections, mitigation techniques, repair/replace activities and monitoring of operating experience to manage the aging of Alloy 600 at WCGS. Detection of indications is accomplished through a variety of examinations consistent with NRC Order EA-03-009, ASME Section XI Subsections IWB and IWC, EPRI Report 1010087 (MRP-139) issued under NEI 03-08 protocol, and NRC Bulletin 2004-01. Mitigation techniques are implemented when appropriate to preemptively remove conditions that contribute to primary water stress corrosion cracking (PWSCC). Repair/replacement activities are performed to proactively remove or overlay Alloy 600 material, or as a corrective measure in response to an unacceptable flaw in the material. Mitigation and repair/replace activities are consistent with those detailed in MRP-139. Operating experience was reviewed to determine the risk rankings of each Alloy 600 location. Operating experience is continually monitored to provide improvements and modifications to the Nickel Alloy Aging Management Program as needed.

Aging Management Program Elements

The results of an evaluation of each element against the 10 elements described in Appendix A of the SRP-LR, NUREG-1800, are provided below.

Scope of Program – Element 1

With the exception of steam generator tubing, which is managed by the Steam Generator Tubing Integrity program (B2.1.8), all Alloy 600 locations in plant systems are included in the scope of this program. This includes reactor coolant system (RCS) pressure boundary, RCS non-pressure boundary, and ESF locations.

Preventive Actions – Element 2

The Nickel Alloy Aging Management Program has many potential mitigation strategies that remove one or more of the three conditions that control primary water stress corrosion cracking (susceptible material, tensile stress field, supporting environment). Mitigation activities that have been successfully performed for at least one US PWR plant include weld overlays, replacement of Alloy 600 (as a pre-planned activity), and mechanical stress improvement process (MSIP). Full structural weld overlays may be used either as a mitigation strategy or as a repair method. This method provides structural reinforcement at the (potentially) flawed location, such that adequate load-carrying capability is provided by the overlay. MSIP is a mechanical process that places the component surface in contact with the primary water in a compressive state, thereby removing the tensile stresses needed for initiation of PWSCC.

The considerations used by the Nickel Alloy Aging Management Program in selecting a mitigation strategy, include availability of method, industry experience, plant location, risk evaluation, and pre-implementation activities.

The program lists the recommended mitigation strategies for all of the Alloy 600 components. Mitigation strategies for several components are still to be determined. Specific mitigation strategies will be determined by plant-specific and industry operating experience. The Water Chemistry program (B2.1.2) provides preventive actions for monitoring and control of the supporting environment for PWSCC.

Parameters Monitored/Inspected – Element 3

The Nickel Alloy Aging Management Program utilizes various inspection and examination techniques for early detection of PWSCC in Alloy 600 components. Visual exams are used to detect evidence of leakage from pressure retaining components due to cracking and/or discontinuities and imperfections on the surface of the component. Surface examinations indicate the presence of surface discontinuities. Volumetric examination indicates the presence of cracking/discontinuities throughout the volume of material.

Detection of Aging Effects – Element 4

The Nickel Alloy Aging Management Program utilizes various visual, surface and volumetric inspection and examination techniques for early detection of PWSCC in Alloy 600 components. Three types of visual exams are used: 1) VT-2 Exams which are conducted to detect evidence of leakage from pressure retaining components, 2) Bare Metal Visual (BMV) Exams which are similar to VT-2 exams but require removal of insulation to allow direct access to the metal surface, and 3) Visual Exams which are conducted to assess the general condition of non-pressure boundary components. Surface Exams are used to indicate the presence of surface discontinuities and are conducted by liquid penetrant or eddy current methods. Volumetric Exams indicate the presence of discontinuities throughout the volume of material and are conducted by radiographic, ultrasonic, or eddy current methods, or a combination.

Monitoring and Trending – Element 5

Relative risk rankings for Alloy 600 locations are included as part of the Nickel Alloy Aging Management Program. The rankings were provided in a study conducted by Westinghouse for WCGS and reflect conclusions based on WCGS data. As additional information from the industry and WCGS is collected and analyzed, the risk rankings may be modified.

The Nickel Alloy Aging Management Program provides the requirements for examination frequencies. The examination frequencies are required by regulation, industry guidelines, and WCGS good practices.

Acceptance Criteria – Element 6

Acceptance criteria are specified in implementing procedures. The implementing procedure or work order will specify examination requirements and acceptance criteria in accordance with the applicable regulatory (NRC Order EA-03-009 or ASME Section XI) or industry guideline. For components included in MRP-139, it requires that all indications found during inspections must be evaluated per ASME Section XI requirements and indications that do not satisfy IWB-3500 acceptance criteria must be dispositioned by analysis (such as IWB-3600), repaired or replaced.

Corrective Actions – Element 7

Relevant indications failing to meet applicable acceptance criteria are repaired or evaluated in accordance with plant corrective action processes.

Corrective actions may be used as tracking and documentation records for changes in plant thought processes and to identify potential improvements in programs from benchmarking activities.

WCGS site QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10CFR50, Appendix B that are acceptable in addressing corrective actions.

Confirmation Process – Element 8

WCGS site QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10CFR50, Appendix B that are acceptable in addressing the confirmation process.

Administrative Controls – Element 9

WCGS site QA procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10CFR50, Appendix B that are acceptable in addressing administrative controls.

Operating Experience — Element 10

A summary of the Alloy 600 locations and whether or not they have experienced in-service cracking throughout the industry is provided in the Nickel Alloy Aging Management Program. Risk rankings were provided in a study conducted by Westinghouse for WCGS and reflect conclusions based on WCGS data. As additional information from the industry and WCGS (including implemented mitigation activities) is collected and analyzed, the risk rankings may be modified.

During the refueling in 2005, through-wall cracking in the Alloy 82/182 weld metal of the steam generator bowl drains was found. The weld metal was removed and replaced with Alloy 52 weld metal. This mitigation was performed on all four steam generators, even though cracking was found on only two of the steam generators.

During the fall of 2006 refueling outage, circumferential indications were found on the pressurizer surge, relief, and safety nozzles to safe end dissimilar metal welds. Full structural weld overlays were applied to all of the pressurizer nozzles. The following changes to the Alloy 600 program resulted from the flaws identified in 2006.

(1) Examinations have been added to the program as a result of the 2006 operating experience. Visual examination of bottom mounted nozzles are performed every other refueling outage. A baseline volumetric examination was performed during Refueling Outage (RF) 14 (Spring 2005) on all hot leg nozzles, cold leg nozzles and bottom mounted nozzles.

(2) Mitigation plans are prioritized in accordance with risk rankings provided in the program. Pressurizer surge, relief, and safety nozzles containing Alloy 600 material have been overlaid with Alloy 690. Options for mitigating reactor coolant loop nozzles are currently being evaluated.

(3) There have been no changes to the frequency or method of inspection other than those identified in paragraphs (1) and (2).

(4) The WCNOC alloy 600 program provides reasonable assurance that PWSCC degradation will be detected in a timely manner because examination plans optimize inspection intervals and techniques, and maximizes the likelihood of detecting a flaw prior to impact on plant safety and reliability. Alloy 600 inspection activities are included as augmented actions in the ISI program, and include BMV, surface, and volumetric examinations as directed by regulatory and industry guidance. The program incorporates plant specific and industry operating experience. WCNOC has taken a proactive approach in mitigating the Pressurizer nozzles via structural weld overlay and has included all locations having susceptible material exposed to primary water in the Alloy 600 program. As part of this program WCNOC is considering available options for repairing/mitigating the Reactor loop nozzles. This proactive approach applies to other high risk or high probability locations, as well.

Enhancements

None

Conclusion

The continued implementation of the Nickel Alloy Aging Management Program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B2.1.35 Reactor Coolant System Supplement

Section 3.1 of NUREG-1800, "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," supplements the aging management programs for the reactor coolant system components with the following additional requirements.

WCNOC will:

A. Reactor Coolant System Nickel Alloy Pressure Boundary Components

Implement applicable (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines, (3) participate in the industry initiatives, such as owners group programs and the EPRI Materials Reliability Program, for managing aging effects associated with nickel alloys, (4) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor coolant system nickel alloy pressure boundary components to the NRC for review and approval, and

B. Rector Vessel Internals

(1) Participate in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluate and implement the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor internals to the NRC for review and approval.

B2.1.36 Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements

Program Description

The Electrical Cable Connections Not Subject to 10 CFR 50.49 EQ Requirements program manages the aging effects of loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation to ensure that electrical cable connections not subject to the environmental qualification (EQ) requirements of 10 CFR 50.49 and within the scope of license renewal are capable of performing their intended function.

As part of the WCGS predictive maintenance program, infrared thermography testing is being performed on a representative sample of Non-EQ electrical cable connections, associated with active or passive components within the scope of license renewal. The infrared thermography testing is being performed to identify loosening of bolted connections due to thermal cycling, ohmic heating, electrical transients, vibration, chemical contamination, corrosion, and oxidation. The selected sample is based upon application (medium and low voltage), circuit loading (energized, non-energized during normal plant operations), and environment (plant indoor air and outdoor air). The testing of a sample of Non-EQ electrical cable connectors is representative, with reasonable assurance, of Non-EQ electrical cable connections within similar applications, circuit loading conditions, and environments. The infrared thermography testing is being performed on a 6 month monitoring interval which meets the requirement of at least once every ten years.

The acceptance criteria for thermography testing are based on the temperature rise above the reference temperature. The reference temperature will be ambient temperatures or the baseline temperature data from the same type of connections being tested. A one time inspection of a sample of low voltage low current or low load connections will be performed prior to the period of extended operation. The inspection will consist of contact resistance testing or other appropriate testing methods used to identify loosening of low voltage low current or low load connections. The selected sample will be based upon application (low voltage), circuit loading (low current or low load), and environment (plant indoor air and outdoor air). The one time inspection of a sample of Non-EQ low voltage low current or low load connections is representative, with reasonable assurance, of Non-EQ electrical cable connections within similar applications, circuit loading conditions, and environments. The technical basis for the sample selection will be documented. The acceptance criteria for each inspection are defined by the specific type of test being performed on the connections. An engineering evaluation will be performed when test acceptance criteria are not met. The evaluation will include identifying the extent of condition, the potential root cause for not meeting the test acceptance criteria, the likelihood of recurrence and the need to expand the sample size and/or frequency of the inspection.

Corrective actions for conditions that are adverse to quality are performed in accordance with the corrective action program as part of the QA program. The corrective action process provides reasonable assurance that deficiencies adverse to quality are either promptly corrected or are evaluated to be acceptable.

NUREG-1801 Consistency

The Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section XI.E6, "Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements."

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancement will be implemented in the following program element:

Parameters Monitored or Inspected – Element 3, Detection of Aging Effects – Element 4, and Acceptance Criteria – Element 6

A onetime inspection of a sample of low voltage low current or low load connections will be performed prior to the period of extended operation. The inspection will consist of contact resistance testing or other appropriate testing methods used to identify loosening of low voltage low current or low load connections.

Corrective Actions - Element 7

The current infrared thermography testing will be enhanced to include performing an engineering evaluation when the acceptance criteria are not met. This engineering evaluation will include identifying the extent of condition to determine if the situation is applicable to other in-scope Non-EQ electrical cable connections that are not part of the testing sample, the potential root cause for not meeting the test acceptance criteria, and the likelihood of recurrence.

Operating Experience

WCGS has routinely performed infrared thermography since 1989 on 189 electrical components. A review of the plant operating experience identified a small number of scans where electrical connections showed thermal anomaly. The connections associated with these thermal anomalies were cleaned and re-tighten. No loss of component intended function has occurred.

Conclusion

The continued implementation of the Electrical Cable Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements program provides reasonable assurance that adverse localized environments are identified and aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B3 TLAA SUPPORT ACTIVITIES

B3.1 METAL FATIGUE OF REACTOR COOLANT PRESSURE BOUNDARY

Program Description

In accordance with WCGS Technical Specifications, the present fatigue aging management program uses cycle counting and usage factor tracking to ensure that actual plant experience remains bounded by design assumptions and calculations reflected in the USAR. It was customized, verified, and validated under a 10 CFR 50 Appendix B quality assurance program for plant-specific implementation at WCGS.

The WCGS Metal Fatigue of Reactor Coolant Pressure Boundary program manages cumulative fatigue damage in metal components of the reactor coolant pressure boundary and analyzed Class 2 portions of the steam generators. The program software counts operating transient cycles and applies analytical methods to determine stress cycles and contributions of them to fatigue usage factors; and tracks the resulting fatigue cumulative usage factors (CUFs). The software maintains a record of CUFs at bounding locations in Class 1 piping and vessels and in the parts of the Class 2 steam generators that have a Class 1 analysis.

The scope of the Metal Fatigue of Reactor Coolant Pressure Boundary program includes the NUREG/CR-6260 monitoring locations applicable to WCGS (with one exception, for which the original fatigue analysis plus effects of the reactor coolant environment have been validated for the period of extended operation).

The program will include action limits applicable to the NUREG/CR-6260 locations, including allowances for environmental effects of the reactor coolant as determined by NUREG/CR-6583 and NUREG/CR-5704 or appropriate alternative methods; and will include action limits to ensure that the bases of the leak-before-break (LBB) analysis and of the high energy line break (HELB) locations remain valid, or that appropriate corrective measures are taken..

NUREG-1801 Consistency

The Metal Fatigue of Reactor Coolant Pressure Boundary program is an existing program that, following enhancement, will be consistent with NUREG 1801, Section X.M1, "Metal Fatigue of Reactor Coolant Pressure Boundary."

Exceptions to NUREG-1801

None

Enhancements

Prior to the period of extended operation, the following enhancements will be implemented in the following program elements:

Detection of Aging Effects, Element 4, and Corrective Actions – Element 7

The Metal Fatigue of Reactor Coolant Pressure Boundary program will be enhanced to include a cycle count action limit and corrective actions. A cycle count limit will be established that requires corrective action when the cycle count for any of the critical thermal and pressure transients is projected to reach a stated percentage of the design-specified number of cycles before the end of the next fuel cycle. If this action limit is reached, acceptable corrective actions include:

1. Review of fatigue usage calculations
   - To determine whether the transient in question contributes significantly to CUF.
   - To identify the components and analyses that are affected by the transient in question.
   - To ensure that the analytical bases of the leak-before-break (LBB) fatigue crack propagation analysis and of the high-energy line break (HELB) locations are maintained.
2. Evaluation of remaining margins on CUF based on cycle-based or stress-based CUF calculations using the WCGS fatigue management program software.
3. Redefinition of the specified number of cycles (e.g., by reducing specified numbers of cycles for other transients and using the margin to increase the allowed number of cycles for the transient that is approaching its specified number of cycles).

The Metal Fatigue of Reactor Coolant Pressure Boundary program will be enhanced to include a cumulative fatigue usage action limit and corrective actions. An action limit will be established that requires corrective action when calculated CUF (from cycle-based or stress-based monitoring) for any monitored location is projected to reach 1.0 within the next 2 or 3 fuel cycles. If this limit is reached acceptable corrective actions include:

1. Determine whether the scope of the monitoring program must be enlarged to include additional affected reactor coolant pressure boundary locations. This determination will ensure that other locations do not approach design limits without an appropriate action.
2. Enhance fatigue monitoring to confirm continued conformance to the code limit.
3. Repair the component.
4. Replace the component.
5. Perform a more rigorous analysis of the component to demonstrate that the design code limit will not be exceeded.
6. Modify plant operating practices to reduce the fatigue usage accumulation rate.
7. Perform a flaw tolerance evaluation and impose component-specific inspections, under ASME Section XI Appendices A or C (or their successors), and obtain required approvals by the NRC.

These corrective actions are equally applicable to the WCGS NUREG/CR-6260 locations including consideration of the effects of the reactor coolant environment..

Confirmation Process – Element 8

The WCGS Metal Fatigue of Reactor Coolant Pressure Boundary program will be enhanced to invoke Appendix B procedural and record requirements.

Operating Experience

The methods of the existing fatigue monitoring program were developed by EPRI, for the industry, in response to NRC concerns that early-life operating cycles at some units had caused fatigue usage factors to accumulate faster than anticipated in the design analyses. This fatigue monitoring program was therefore designed to ensure that the code limit will not be exceeded in the remainder of the licensed life. The operating experience program reviews industry experience, including experience that may affect fatigue monitoring to ensure that applicable experience is evaluated and incorporated in plant analyses and procedures. Any necessary evaluations are conducted under the plant corrective action program.

The program has remained responsive to emerging issues and concerns, particularly:

Pressurizer surge and spray nozzle, hot leg surge nozzle, and surge line transients: This concern prompted operation with continuous spray during startup and shutdown transients, and inclusion of these locations in the fatigue monitoring program.

Axisymmetric thermal shock and thermal striping in the steam generator feedwater nozzles: Evaluation of low-flow transients in the feedwater nozzles raised concerns for thermal-instability-driven transients under these conditions, with possible thermal shock, thermal stratification bending, and skin-effect thermal striping. WCGS installed additional monitoring points to permit the fatigue monitoring system to collect data during operation; and developed unique correlations ("transfer functions") to calculate these effects.

Reduction and equalization of fatigue usage factor accumulation rate in charging nozzles: Westinghouse and WCGS found that operating practices were cycling flow through the active primary loop charging nozzle more often than necessary and were also failing to use the two nozzles equally, resulting in accumulation of fatigue usage at a higher rate than indicated by the code analysis. Operations modified procedures and practices to reduce cycling and to equalize cycling between the two charging nozzles. The fatigue monitoring program evaluated the nozzle CUF to date, and fatigue in these nozzles is now tracked by the program.

Results of fatigue monitoring to date indicate that the number of design transient events assumed by the original design analysis will be sufficient for a 60-year operating period, and that the design basis fatigue cumulative usage factor limit of 1.0 will not be exceeded at the monitored locations for a 60-year licensed operating period.

Conclusion

The continued implementation of the Metal Fatigue of Reactor Coolant Pressure Boundary program provides reasonable assurance that aging effects will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

B3.2 ENVIRONMENTAL QUALIFICATION (EQ) OF ELECTRICAL COMPONENTS

Program Description

The Environmental Qualification (EQ) of Electrical Components program manages component thermal, radiation, and cyclical aging through the use of aging evaluations based on 10 CFR 50.49(f) qualification methods. As required by 10 CFR 50.49, EQ components not qualified for the current license term are to be refurbished or replaced, or have their qualification extended prior to reaching the aging limits established in the evaluation. Aging evaluations for EQ components that specify a qualification of at least 40 years are considered time-limited aging analyses (TLAAs). The Environmental Qualification (EQ) of Electrical Components program is consistent with the requirements of 10 CFR 50.49, and the guidance of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment" and Regulatory Guide 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants", Revision 1 for maintaining qualification of equipment.

Qualified components and their service requirements and environments are identified in controlled documents containing a master list of affected equipment, a replacement and maintenance information, and local environment descriptions.

Analytical Methods:

Reanalysis may refine previously-conservative methods or conservative environmental condition assumptions; may invoke local environmental data collected for that purpose; and may change underlying assumptions, acceptance criteria, and corrective actions (if acceptance criteria are not met). Thermal effects are estimated by Arrhenius methods. Normal operating radiation and cyclic effects are assumed linear with time unless adjustments are possible or necessary because of operating, configuration, shielding, power, or measured dose changes.

Data Collection and Reduction Methods:

The EQ Program does not maintain condition or performance monitoring programs for purposes of confirming qualified life. Reanalysis may, however, invoke local environmental data collected for that purpose, and the EQ Program employs surveillance or maintenance activities when required by the qualification evaluation for an individual component. Any changes to material activation energy values as part of a reanalysis will be justified.

Underlying Assumptions:

EQ component aging evaluations contain sufficient conservatism to account for most environmental changes occurring due to plant modifications and events. When unexpected adverse conditions are identified during operational or maintenance activities that affect the normal operating environment of a qualified component, the affected EQ component is evaluated and appropriate corrective actions are taken, which may include changes to the qualification bases and conclusions. The reanalysis of an aging evaluation is documented according to the station's quality assurance program, which requires the verification of assumptions and conclusions.

Acceptance Criteria and Corrective Actions:

If the qualification cannot be extended by reanalysis, the component will be refurbished, replaced, or requalified to maintain qualification for the period of extended operation. A reanalysis is to be performed in a timely manner (that is, sufficient time is available to refurbish, replace, or requalify the component if reanalysis is unsuccessful).

NUREG-1801 Consistency

The Environmental Qualification (EQ) of Electrical Components program is an existing program that, following enhancement, will be consistent with NUREG-1801, Section X.E1, "Environmental Qualification (EQ) of Electrical Components."

Exceptions to NUREG-1801

None

Enhancements

None

Operating Experience

The Environmental Qualification (EQ) of Electrical Components program is consistent with the guidance of 10 CFR 50.49, NUREG-0599, and Regulatory Guide 1.89, and includes consideration of operating experience for determining qualification bases and conclusions, including qualified life.

Operating experiences, system, equipment or component related information, as reported through NRC Bulletins, Information Notices, Generic Letters and Part 21 Notifications are evaluated for applicability. When an emerging industry aging issue is identified that affects the qualification of an EQ component, the affected component is evaluated and appropriate corrective actions are taken. Any change to the qualification evaluations are documented in the affected EQ work packages, and any applicable corrective actions are identified. Issues addressing equipment aging are reconciled in sections that specifically document thermal, radiation and cyclic qualified lives.

Conclusion

The continued implementation of the Environmental Qualification (EQ) of Electrical Components program provides reasonable assurance that aging will be managed such that the systems and components within the scope of this program will continue to perform their intended functions consistent with the current licensing basis for the period of extended operation.

**Wolf Creek Generating Station (WCGS) License Renewal Application (LRA)
Amendment Chapter 2**

Table 2.2-1 WCGS Scoping Results (Continued)

System/Structure	In Scope	Section 2 Scoping Results
Cranes, hoists, and elevator system	Yes	2.3.3.19
Diesel generator building HVAC system	Yes	2.3.3.13
Emergency diesel engine fuel oil storage and transfer system	Yes	2.3.3.15
Emergency diesel engine system	Yes	2.3.3.16
Essential service water system	Yes	2.3.3.3
Essential service water pumphouse building HVAC system	Yes	2.3.3.11
Fire protection system	Yes	2.3.3.14
Floor and equipment drains system	Yes	2.3.3.17
Fuel building HVAC system	Yes	2.3.3.10
Fuel handling – fuel storage and handling system	Yes	2.3.3.1
Fuel pool cooling and cleanup system	Yes	2.3.3.2
Oily waste system	Yes	2.3.3.18
Miscellaneous buildings HVAC system	Yes	2.3.3.12
Miscellaneous auxiliary systems in-scope only for criterion 10CFR54.4(a)(2), includes:	Yes	2.3.3.21
Service water system		
Essential service water chemical addition system		
Chemical and detergent waste system		
Gaseous radwaste system		
Demineralized water makeup storage and transfer system		
Domestic water system		
Plant heating system		
Boron recycle system		
Central chilled water system		
Yard drainage system		
Secondary liquid waste system		
Roof drains system		
Turbine building HVAC system	Yes	2.3.3.20
Circulating water system includes:	No	N/A
Screen wash system		
Acid feed system		
Chemical injection system		
Gland water and motor cooling water systems		
Circulating water system – yard		
Circulating water system – power block		
Closed cooling water system	No	N/A
Cooling lake makeup water and blowdown system	No	N/A
Demineralized water group includes:	No	N/A
Makeup demineralizer system		
Caustic handling system		
Miscellaneous gas systems:	No	N/A
Carbon dioxide gas system		

Table 2.2-1 WCGS Scoping Results (Continued)

System/Structure	In Scope	Section 2 Scoping Results
Carbon dioxide gas system		
Hydrogen gas system		
I&C shop nitrogen gas system		
Nitrogen gas system		
Oxygen gas system		
Miscellaneous compressed air systems includes:	No	N/A
I&C shop compressed air system		
MMO service air system		
Shop service air system		
Miscellaneous diesels group includes: Diesel generator system – Emergency Operations Facility and Technical Support Center	No	N/A
Miscellaneous drains system includes:	No	N/A
Waste water treatment system		
Sanitary drainage system		
Chemical onsite and offsite drainage		
Equipment and floor drains		
Miscellaneous HVAC includes:	No	N/A
Containment atmosphere control system		
Radwaste building HVAC system		
I&C shop HVAC		
I&C shop computer HVAC		
Health physics computer room HVAC		
ED Center HVAC		
Circulating water and makeup water screenhouse ventilation		
Shop building machine shop area ventilation		
Shop building HVAC		
Administration building HVAC		
Technical support building HVAC		
Waste water treatment ventilation		
Administrative/Shop building HVAC refrigeration		
Solid radwaste system	No	N/A
Radioactive liquid release system	No	N/A
Process sampling and analysis system	No	N/A
Sewage treatment system	No	N/A
Steam and Power Conversion System		
Auxiliary feedwater system	Yes	2.3.4.6
Condensate system includes:	Yes	2.3.4.4
Condensate storage and transfer system		
Feedwater system includes:	Yes	2.3.4.3
Condensate and feedwater chemical addition system		

2.3.2.2 Containment Spray System

System Description

The purpose of the containment spray system is to provide borated alkaline water for removing decay heat and iodine from the containment atmosphere in post accident conditions. The system consists of two redundant trains, each of which includes a containment spray pump, spray nozzles and associated valves and piping. Suction paths are provided from the refueling water storage tank for initial system flow and from the containment recirculation sumps for long term operation. Each train is provided with a discharge path through the spray nozzles located in the upper containment. A common spray additive tank provides sodium hydroxide via eductors to both trains to ensure a basic pH that promotes absorption of iodine from the containment atmosphere.

System Function

The containment spray system removes decay heat and radioactive iodine from the containment atmosphere in post accident conditions to maintain the containment pressure below design limits and maintain offsite release less than the limits of 10CFR100. The containment spray system cools containment air and causes it to drop to lower elevations causing some hydrogen mixing to occur.

Containment isolation valves, suction line guard pipes and valve encapsulations are provided to ensure that containment integrity is maintained in single failure scenarios.

The containment spray system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety-related affecting safety-related components for structural integrity and spatial interaction based on the criterion of 10 CFR 54.4(a)(2). Portions of the containment spray system support fire protection and environmental qualification requirements based upon the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the containment spray system are included in USAR Section 6.5.2, Table 3.11(B)-3 and Table 3.11(B)-9.

License Renewal Drawings

The license renewal drawing for the containment spray system is listed below:

LR-WCGS-EN-M-12EN01

2.3.2.4 Decontamination System

System Description

The decontamination system is used to decontaminate removable components in the hot machine shop in the auxiliary building and to supply water to the cask washdown pit in the fuel building. The decontamination system consists of a cask washdown pit in the fuel building, wash tanks, pumps, filters, spray booth, ultrasonic generator, turbulator, and associated piping and valves.

System Function

Portions of the decontamination system provide containment isolation for the reactor vessel head decontamination penetration P-43. The decontamination system is in the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the decontamination system provide structural integrity for the containment penetration. Portions of the decontamination system have spatial interaction with safety-related components in the fuel building. Portions are in scope as non-safety-related components affecting safety-related components based on the criterion of 10 CFR 54.4(a)(2).

WCGS USAR References

Additional details of the decontamination system are included in USAR Section 12.3.1.1.2 and Table 6.2.4-1

License Renewal Drawings

The license renewal drawing for the decontamination system is listed below:

LR-WCGS-HD-M-12HD01

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.2-4, Decontamination System.

Table 2.3.2-4 Decontamination System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Valve	Leakage Boundary (spatial) Pressure Boundary

The aging management review results for these component types are provided in Table 3.2.2-4, Engineered Safety Features System – Summary of Aging Management Evaluation - Decontamination System.

Table 2.3.2-5 Liquid Radwaste System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Flow Element	Leakage Boundary (spatial) Pressure Boundary
Heat Exchanger Shell Side RC Drain Tank Heat Exchanger Shell (HX # 10)	Pressure Boundary
Heat Exchanger Tube Side RC Drain Tank Heat Exchanger Tube Sheet (HX # 11) RC Drain Tank Heat Exchanger Tubes (HX # 12) RC Drain Tank Heat Exchanger Head (HX # 13)	Pressure Boundary
Heater	Leakage Boundary (spatial)
Instrument Bellows	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Spacer Ring	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Thermowell	Leakage Boundary (spatial) Pressure Boundary
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.2.2-5, Engineered Safety Features System – Summary of Aging Management Evaluation - Liquid Radwaste System.

2.3.2.6 Reactor Makeup Water System

System Description

The reactor makeup water system (RMWS) stores deaerated water to be used upon demand within the plant. The RMWS receives filtered, deaerated, demineralized water from the demineralized water storage and transfer system. The RMWS consists of one storage tank, two transfer pumps and a tank steam coil heater, and the associated piping, valves, and instrumentation.

System Function

The RMWS provides containment isolation for penetration P-25. The RMWS containment penetration is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety-related affecting safety-related components for structural integrity and spatial interaction based on the criterion of 10 CFR 54.4(a)(2). Portions of the RMWS containment support environmental qualification requirements based on the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the RMWS are included in USAR Section 9.2.7 and Table 6.2.4-1.

License Renewal Drawings

The license renewal drawing for the reactor makeup water system is listed below:

LR-WCGS-BL-M-12BL01

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.2-6, Reactor Makeup Water System.

Table 2.3.2-6 Reactor Makeup Water System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Orifice	Leakage Boundary (spatial)

Table 2.3.2-6 Reactor Makeup Water System (Continued)

Component Type	Intended Function
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Spacer Ring	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial)
Valve	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.2.2-6, Engineered Safety Features System – Summary of Aging Management Evaluation - Reactor Makeup Water System.

2.3.2.7 Containment Purge HVAC System

System Description

The purpose of the containment purge HVAC system is to provide ventilation of the containment for habitability when required and provide a vent path for equalization of containment pressure with the atmosphere. The containment minipurge sub-system removes noble gas from the containment prior to and during personnel access to the containment in modes 1, 2, 3 and 4. It also equalizes containment internal pressure with the external pressure in modes 1, 2, 3 and 4.

The containment shutdown purge sub-system supplies outside air into the containment for ventilation and cooling or heating needed for prolonged containment access following a shutdown and during refueling. The containment purge system consists of the common HVAC intake, common unit vent, nonessential filtering units, supply fans, exhaust fans, containment isolation valves, radiation monitors and associated ventilation ducts.

System Function

Containment isolation is provided by two valves at each penetration providing redundancy for the isolation function. The common intake provides air and tornado isolation for various essential and nonessential HVAC systems. The unit vent provides a common monitored vent path and tornado protection for various essential and nonessential HVAC systems.

The containment purge system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety-related affecting safety-related

Table 2.3.2-7 Containment Purge HVAC System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Damper	Fire Barrier Pressure Boundary
Ductwork	Direct Flow Pressure Boundary
Flex Connector	Pressure Boundary
Heat Exchanger Tube Side Containment Purge Supply Air Unit Chilled Water Heat Exchanger Tubes (HX # 14) Containment Purge Supply Air Unit Hot Water Heat Exchanger Tubes (HX # 15) Containment Mini Purge Supply Air Unit Hot Water Heat Exchanger Tubes (HX # 16)	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary

mixing, adequate to prevent formation of hydrogen pockets, is assured without reliance on mixing fans.

Containment isolation is provided by two valves each at penetrations P-56, P-65, P-97, P-99, and P-101.

The hydrogen control system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the hydrogen control system are within the scope of license renewal as nonsafety-related affecting safety-related components based on the criterion of 10 CFR 54.4(a)(2). Portions of the hydrogen control system support environmental qualification requirements based on the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the hydrogen control system are included in USAR Section 6.2.5 and Table 3.11(B)-3.

License Renewal Drawings

The license renewal drawing for the hydrogen control system is listed below:

LR-WCGS-GS-M-12GS01

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.2-9, Hydrogen Control System.

Table 2.3.2-9 Hydrogen Control System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Orifice	Pressure Boundary
Piping	Pressure Boundary Structural Integrity (attached)
Recombiner	Direct Flow
Sample Vessel	Pressure Boundary
Tubing	Pressure Boundary Structural Integrity (attached)
Valve	Pressure Boundary

LR-WCGS-EM-M-12EM02
LR-WCGS-EM-M-12EP01

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.2-10, High Pressure Coolant Injection System.

Table 2.3.2-10 High Pressure Coolant Injection System

Component Type	Intended Function
Accumulator	Pressure Boundary
Class 1 Piping <= 4in	Pressure Boundary
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Filter	Filter Pressure Boundary
Flow Element	Leakage Boundary (spatial) Pressure Boundary
Heat Exchanger Shell Side HPCI Pump Lube Oil Cooler Shell (HX # 17)	Pressure Boundary
Heat Exchanger Tube Side HPCI Pump Lube Oil Cooler Tubes (HX # 18) HPCI Pump Lube Oil Cooler Tube Sheet (HX # 19) HPCI Pump Lube Oil Cooler Heads (HX # 20) RWST Heating Coils (HX # 163)	Heat Transfer Leakage Boundary (spatial) Pressure Boundary
Instrument Bellows	Pressure Boundary
Orifice	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary, SIA
Pump	Pressure Boundary
Sight Gauge	Pressure Boundary
Spacer Ring	Pressure Boundary
Tank	Pressure Boundary
Thermowell	Leakage Boundary (spatial) Pressure Boundary

Table 2.3.2-10 High Pressure Coolant Injection System (Continued)

Component Type	Intended Function
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary, SIA

The aging management review results for these component types are provided in Table 3.2.2-10, Engineered Safety Features System – Summary of Aging Management Evaluation - High Pressure Coolant Injection System.

2.3.2.11 Residual Heat Removal System

System Description

The purpose of the residual heat removal (RHR) system is to remove decay heat in post accident conditions and to provide safety injection during a LOCA.

The system is also used for shutdown cooling in non-accident conditions to remove decay heat and consists of two redundant trains, each of which includes a containment recirculation sump, RHR pump, heat exchanger and associated valves and piping. Suction paths are provided from the refueling water storage tank for safety injection flow and from the containment recirculation sumps for long term post LOCA decay heat removal. Each train is provided with a discharge path to both the hot and cold legs.

System Function

The RHR System provides borated water for reactor coolant system makeup in LOCA conditions and for removing decay heat in post accident conditions. Containment isolation valves, suction line guard pipes and valve encapsulations are provided to ensure that containment integrity is maintained in single failure scenarios.

The RHR system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the RHR system are in scope for structural integrity, and RHR test lines and drain lines form spatial leakage boundaries that are within the scope based on the criterion of 10 CFR 54.4(a)(2). Portions of the RHR system support fire protection and environmental qualification requirements based on the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the residual heat removal system are included in USAR Sections 5.4.7

- Auxiliary systems within the scope of license renewal only based on the criterion of 10 CFR 54.4(a)(2):
  - Service water system
  - Essential service water chemical addition system
  - Chemical and detergent waste system
  - Gaseous radwaste system
  - Demineralized water makeup storage and transfer system
  - Domestic water system
  - Plant heating system
  - Boron recycle system
  - Central chilled water system
  - Yard drainage system
  - Secondary liquid waste system
  - Roof drains system

2.3.3.1 Fuel Handling – Fuel Storage and Handling System

System Description

The purpose of the fuel handling – fuel storage and handling system is to provide onsite storage of fuel assemblies, manipulation of fuel, and servicing of the reactor. The system consists of machines, devices, cranes, elevators, transfer systems, fixtures, tooling, and storage racks. Crane rails and their supports are evaluated with their appropriate structure. The following cranes, fuel handling equipment, neutron absorbers and fuel racks are within the scope of license renewal.

- Spent fuel pool bridge crane
- Containment building polar crane
- Cask handling crane
- Refueling machine
- Reactor vessel head lifting device
- Reactor vessel internals lifting device
- Rod cluster control changing fixture
- 17X17 spent fuel assembly handling tool

Table 2.3.3-2 Fuel Pool Cooling and Cleanup System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Flow Element	Leakage Boundary (spatial) Pressure Boundary
Expansion Joint Bellows	Pressure Boundary
Heat Exchanger Shell Side Fuel Pool Cooling Heat Exchanger Shell (HX # 26)	Pressure Boundary
Heat Exchanger Tube Side Fuel Pool Cooling Heat Exchanger Tube Sheet (HX # 27) Fuel Pool Cooling Heat Exchanger Tubes (HX # 28) Fuel Pool Cooling Heat Exchanger Head (HX # 29)	Heat Transfer Pressure Boundary
Penetrations Mechanical	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial) Pressure Boundary
Spacer Ring	Pressure Boundary
Strainer	Nonsafety-related structural support
Thermowell	Pressure Boundary
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

2.3.3.5 Containment Cooling System

System Description

The purpose of the containment cooling system is to remove heat energy from the containment. The containment cooling system also transfers sufficient heat energy to the essential service water system (ESWS) to prevent the ESWS inlet trash racks from being blocked by frazil ice. The containment cooling system consists of four containment coolers, cooling water piping, and valves.

System Function

The containment cooling system, in conjunction with the containment spray system, removes sufficient energy and subsequent decay heat from the containment atmosphere following a design basis LOCA or MSLB inside the containment to maintain the containment below the design pressure. Some hydrogen mixing will occur as the containment air coolers take suction from above the operating floor and discharge to the lower levels of containment. Heat removed from the containment atmosphere by the containment coolers is transferred to the ESWS. This provides sufficient heat energy to prevent the ESWS inlet trash racks from being blocked by frazil ice. Freeze protection for the ESWS intake structure is provided by a warming line which branches from each essential service water return line. The containment cooling system also provides containment isolation (containment penetrations associated with containment pressure sensing instrumentation).

The containment cooling system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the system support fire protection and environmental qualification requirements based on the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the containment cooling system are included in USAR Sections 6.2.2.2, 9.2.1.2.2.3 and 9.4.6 and Table 3.11(B)-3 and Table 3.11(B)-9.

License Renewal Drawings

The license renewal drawing for the containment cooling system is listed below:

LR-WCGS-GN-M-12GN01

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-5, Containment Cooling System.

building and auxiliary building. Portions of the CVCS support fire protection, environmental qualification, and station blackout requirements based on the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the chemical and volume control system are included in USAR Section 9.3.4 and Table 6.2.4-1.

License Renewal Drawings

The license renewal drawings for the chemical and volume control system are listed below:

LR-WCGS-BG-M-12BG01
LR-WCGS-BG-M-12BG02
LR-WCGS-BG-M-12BG03
LR-WCGS-BG-M-12BG04
LR-WCGS-BG-M-12BG05

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-7, Chemical and Volume Control System.

Table 2.3.3-7 Chemical and Volume Control System

Component Type	Intended Function
Class 1 Piping <= 4in	Pressure Boundary
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Filter	Filter Pressure Boundary
Flexible Hoses	Pressure Boundary

Table 2.3.3-7 Chemical and Volume Control System (Continued)

Component Type	Intended Function
Flow Element	Leakage Boundary (spatial) Pressure Boundary
Heat Exchanger Shell Side Letdown Heat Exchanger Shell (HX # 41) Excess Letdown Heat Exchanger Shell (HX #42) Seal Water Heat Exchanger Shell (HX # 43) Centrifugal Charging Pump Lube Oil Cooler Shell (HX # 44) Moderating Heat Exchanger Shell (HX # 45) Letdown Reheat Heat Exchanger Shell (HX # 46) Regenerative Heat Exchanger Shell (HX # 47) Letdown Chiller Heat Exchanger Shell (HX # 159)	Leakage Boundary (spatial) Pressure Boundary
Heat Exchanger Tube Side Centrifugal Charging Pump Lube Oil Cooler Tubes (HX # 48) Centrifugal Charging Pump Lube Oil Cooler Tube Sheet (HX # 49) Centrifugal Charging Pump Lube Oil Cooler Head (HX # 50) Letdown Heat Exchanger Tube Sheet (HX # 51) Letdown Heat Exchanger Tubes (HX # 52) Letdown Heat Exchanger Head (HX # 53) Excess Letdown Heat Exchanger Tube Sheet (HX # 54) Excess Letdown Heat Exchanger Tubes (HX # 55) Excess Letdown Heat Exchanger Head (HX # 56) Seal Water Heat Exchanger Tube Sheet (HX # 57) Seal Water Heat Exchanger Tubes (HX # 58) Seal Water Heat Exchanger Head (HX # 59) Moderating Heat Exchanger Head (HX # 60) Moderating Heat Exchanger Tubes (HX # 61) Moderating Heat Exchanger Tube Sheet (HX # 62) Letdown Reheat Heat Exchanger Tube Sheet (HX # 63) Letdown Reheat Heat Exchanger Tubes (HX # 64) Letdown Reheat Heat Exchanger Head (HX # 65) Regenerative Heat Exchanger Tube Sheet (HX # 66) Regenerative Heat Exchanger Tubes (HX # 67) Regenerative Heat Exchanger Head (HX # 68) Letdown Chiller Heat Exchanger Tubes (HX # 160) Letdown Chiller Heat Exchanger Tube Sheet (HX # 161) Letdown Chiller Heat Exchanger Head (HX # 162)	Heat Transfer Leakage Boundary (spatial) Pressure Boundary
Instrument Bellows	Leakage Boundary (spatial) Pressure Boundary
Insulation	Insulate
Orifice	Leakage Boundary (spatial) Pressure Boundary Throttle
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

Table 2.3.3-7 Chemical and Volume Control System (Continued)

Component Type	Intended Function
Pump	Leakage Boundary (spatial) Pressure Boundary
Sight Gauge	Pressure Boundary
Spacer Ring	Leakage Boundary (spatial) Pressure Boundary
Tank	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Thermowell	Leakage Boundary (spatial) Pressure Boundary
Tubing	Leakage Boundary (spatial) Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.3.2-7, Auxiliary Systems – Summary of Aging Management Evaluation - Chemical and Volume Control System.

2.3.3.8 Auxiliary Building HVAC System

System Description

The auxiliary building HVAC system consists of the following four subsystems:

Auxiliary building supply subsystem—provides conditioned outside air to the auxiliary building for ventilation and for cooling of safety-related equipment rooms in each level of the auxiliary building. The auxiliary building supply subsystem is isolated upon a safety injection signal.

Auxiliary building/fuel building normal exhaust subsystem—the auxiliary and fuel buildings share this exhaust subsystem that exhausts clean auxiliary/fuel building air to the environment. This subsystem also exhausts decontamination tank scrubber air to the environment. The auxiliary building/fuel building normal exhaust subsystem is isolated upon a safety injection signal or in the event of a radioactive release from a fuel handling accident in the fuel building.

Emergency exhaust subsystem—collects and processes airborne particulates in the auxiliary building/fuel building. This subsystem also exhausts air purged from the containment via the containment hydrogen control system. Air is exhausted to the vent stack.

Access tunnel transfer fan – transfers air from the auxiliary building to the radwaste tunnel. This subsystem is split between the auxiliary building HVAC system and the miscellaneous building HVAC system..

System Function

The auxiliary building HVAC system is required to maintain a suitable environment for safety-related equipment under both normal conditions and during design basis events. Portions of the auxiliary building HVAC system are isolated upon a safety injection signal. The portion of the auxiliary building/fuel building normal exhaust subsystem serving the fuel building is automatically isolated, and the exhaust fan flow maintained in the event of a radioactive release from a fuel handling event.

Individual pump room coolers provide a suitable ambient environment for the electric motor drivers for the safety-related pumps. The penetration room coolers provide a suitable atmosphere for the safety-related electrical equipment located in the electrical penetration rooms.

The auxiliary building HVAC system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the Auxiliary Building HVAC System are in scope as non-safety related affecting safety-related components based upon the criterion of 10CFR54.4(a)(2). . Portions of the auxiliary building HVAC system support fire protection and environmental qualification requirements based upon the criteria of 10 CFR 54.4(a)(3).

WCGS USAR References

Additional details of the auxiliary building HVAC system are included in USAR Sections 9.4.2 and 9.4.3 and Table 9.4-8 and Table 9.4-9.

License Renewal Drawings

The license renewal drawings of the auxiliary building HVAC system are listed below:

LR-WCGS-GL-M-12GL01
LR-WCGS-GL-M-12GL02
LR-WCGS-GL-M-12GL03

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-8, Auxiliary Building HVAC System.

Table 2.3.3-8 Auxiliary Building HVAC System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Damper	Fire Barrier Pressure Boundary
Ductwork	Pressure Boundary
Fan	Pressure Boundary
Flex Connector	Pressure Boundary
Heat Exchanger Shell Side Safety Injection Pump Room Cooler Fins (HX # 69) Safety Injection Pump Room Cooler Casing (HX # 70) RHR Pump Room Cooler Fins (HX # 71) RHR Pump Room Cooler Casing (HX # 72) CCW Pump Room Cooler Fins (HX # 73) CCW Pump Room Cooler Casing (HX # 74) Charging Pump Room Cooler Fins (HX #75) Charging Pump Room Cooler Casing (HX # 76) Containment Spray Pump Room Cooler Fins (HX # 77) Containment Spray Pump Room Cooler Casing (HX # 78) Penetration Room Cooler Fins (HX # 79) Penetration Room Cooler Casing (HX # 80)	Heat Transfer Pressure Boundary

Table 2.3.3-8 Auxiliary Building HVAC System (Continued)

Component Type	Intended Function
Heat Exchanger Tube Side Auxiliary Building Basement Corridor Unit Heater Coils (HX # 81) Auxiliary Building Basement Corridor Fan Coil Unit (HX # 82) Auxiliary Building Hot Instrument Shop Unit Heater Coils (HX # 83) Auxiliary Building Interim Floor Corridor Unit Heater Coils (HX # 84) Auxiliary Building Operating Floor HVAC Equipment Room Unit Heater Coils (HX # 85) Auxiliary Building Personnel Access Area Unit Heater Coils (HX # 86) Auxiliary Building Supply Air Unit Cooling Coils (HX # 87) Auxiliary Building Supply Air Unit Heating Coils (HX # 88) Electrical Equipment Room Cooler Coils (HX # 89) Ground Floor Fan Coil Unit Coils (HX # 90) Normal Charging Pump Fan Coil Unit Cooling Coils (HX # 91) Component Cooling Water Pump Room Fan Coil Unit (HX # 92) Safety Injection Pump Room Cooler Head (HX # 93) Safety Injection Pump Room Cooler Tubes (HX # 94) RHR Pump Room Cooler Head (HX # 95) RHR Pump Room Cooler Tubes (HX # 96) Component Cooling Water Pump Room Cooler Head (HX # 97) Component Cooling Water Pump Room Cooler Tubes (HX # 98) Charging Pump Room Cooler Head (HX # 99) Charging Pump Room Cooler Tubes (HX # 100) Containment Spray Pump Room Cooler Head (HX # 101) Containment Spray Pump Room Cooler Tubes (HX # 102) Penetration Room Cooler Head (HX # 103) Penetration Room Cooler Tubes (HX # 104)	Heat Transfer Leakage Boundary (spatial) Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Tubing	Pressure Boundary

Table 2.3.3-8 Auxiliary Building HVAC System (Continued)

Component Type	Intended Function
Valve	Leakage Boundary (spatial) Pressure Boundary

The aging management review results for these component types are provided in Table 3.3.2-8, Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building HVAC System.

2.3.3.9 Control Building HVAC System

System Description

The control building HVAC system consists of seven subsystems:

Control building supply subsystem—supplies outside conditioned air to the control building under normal conditions and is isolated in accident conditions.

Control building exhaust subsystem—exhausts air from clean areas of the control building under normal conditions and is isolated in accident conditions.

Access control exhaust subsystem—exhausts air from potentially contaminated portions of control building. Air is filtered, and then exhausted through the unit vent. This subsystem is isolated in accident conditions.

Control room air conditioning subsystem—maintains suitable environment for personnel and equipment during normal and accident conditions.

Class 1E electrical equipment air conditioning subsystem—maintains suitable environment for Class 1E electrical equipment during normal and accident conditions.

Secondary alarm station (SAS) room air conditioning subsystem—provides a suitable environment for SAS during normal conditions. This subsystem is non-safety related and is not in the scope of license renewal.

Counting room recirculation subsystem—provides a suitable environment for personnel and equipment in counting room during normal conditions. This subsystem is non-safety related and is not in the scope of license renewal.

Table 2.3.3-14 Fire Protection System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Filter	Filter Pressure Boundary
Flame Arrestor	Pressure Boundary
Flexible Hoses	Pressure Boundary
Hose Station	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary
Pump	Pressure Boundary
Sight Gauge	Pressure Boundary
Silencer	Pressure Boundary
Spray Nozzle	Spray
Sprinkler Head	Pressure Boundary Spray
Strainer	Filter Pressure Boundary
Tank	Pressure Boundary
Tubing	Pressure Boundary
Valve (including fire hydrant)	Leakage Boundary (spatial) Pressure Boundary

Table 2.3.3-15 Emergency Diesel Engine Fuel Oil Storage and Transfer System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Flame Arrestor	Pressure Boundary
Instrument	Pressure Boundary
Piping	Pressure Boundary Structural Integrity (attached)
Pump	Pressure Boundary
Strainer	Filter Pressure Boundary
Tank	Pressure Boundary
Tubing	Pressure Boundary
Valve	Pressure Boundary

The aging management review results for these component types are provided in Table 3.3.2-15, Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine Fuel Oil Storage and Transfer System.

2.3.3.16 Emergency Diesel Engine System

System Description

The purpose of the emergency diesel engine system (also known as the standby diesel engine system) is to provide emergency power in the event of a loss of offsite power. The emergency diesel engine system includes the following four sub-systems: emergency diesel engine cooling water system (EDECWS), emergency diesel engine starting system (EDESS), emergency diesel engine lubrication system (EDELS), and emergency diesel engine combustion air intake and exhaust system (EDECAIES).

The EDECWS consists of an engine-driven pump, a jacket water heat exchanger, an electric motor-driven keep-warm pump, an electric keep-warm heater, an engine-driven intercooler pump, intercooler heat exchanger, an expansion tank, and connected piping, valves, controls, and instrumentation.

Each diesel engine has its own starting system. The starting system for each diesel has two redundant, independent starting air trains, one for each bank of cylinders. Each starting air

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-16, Emergency Diesel Engine System.

Table 2.3.3-16 Emergency Diesel Engine System

Component Type	Intended Function
Expansion Joint	Pressure Boundary
Filter	Filter Pressure Boundary
Flex Connector	Pressure Boundary
Heat Exchanger Shell Side Emergency Diesel Engine Intercooler Heat Exchanger Shell (HX # 139) Emergency Diesel Engine Jacket Water Heat Exchanger Shell (HX # 140) Emergency Diesel Engine Lube Oil Cooler Shell (HX # 141)	Pressure Boundary
Heat Exchanger Tube Side Emergency Diesel Engine Intercooler Heat Exchanger Head (HX # 142) Emergency Diesel Engine Intercooler Heat Exchanger Tube Sheets (HX # 143) Emergency Diesel Engine Intercooler Heat Exchanger Tubes (HX # 144) Emergency Diesel Engine Jacket Water Heat Exchanger Head (HX # 145) Emergency Diesel Engine Jacket Water Heat Exchanger Tube Sheets (HX # 146) Emergency Diesel Engine Jacket Water Heat Exchanger Tubes (HX # 147) Emergency Diesel Engine Lube Oil Cooler Head (HX # 148) Emergency Diesel Engine Lube Oil Cooler Tube Sheets (HX # 149) Emergency Diesel Engine Lube Oil Cooler Tubes (HX # 150)	Heat Transfer Pressure Boundary
Heater	Pressure Boundary
Insulation	Insulate

Table 2.3.3-16 Emergency Diesel Engine System (Continued)

Component Type	Intended Function
Orifice	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Pressure Boundary
Separator	Pressure Boundary
Sight Gauge	Pressure Boundary
Silencer	Pressure Boundary
Strainer	Filter Pressure Boundary
Tank	Pressure Boundary
Tubing	Pressure Boundary
Thermowell	Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary

The aging management review results for these component types are provided in Table 3.3.2-16, Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System.

Non-radioactive wastes are collected in sumps and pumped to an oil/water separator outside of the power block for processing and disposal. Radiation monitoring and automatic system isolation is provided in the power block. Potentially oily wastes are routed to the cooling lake after passing through the oil separator. The oily waste system consists of piping, valves, tanks, and pumps.

System Function

The oily waste system contains safety-related indicators in the basement of the control building and in the diesel generator room to provide indication of a potential flooding condition in those areas. These level indicators provide indication of an event which could prevent the capability to shutdown the reactor and maintain it in a safe shutdown condition.

The oily waste system is in scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions of the oily waste system are within the scope of license renewal as non-safety-related components affecting safety-related components for spatial interaction based on the criterion of 10 CFR 54.4(a)(2).

WCGS USAR References

Additional details of the oily waste system are included in USAR Section 9.3.3.2.1.2.

License Renewal Drawings

The license renewal drawings for the oily waste system are listed below:

LR-WCGS-LE-M-12LE01
LR-WCGS-LE-M-12LE02

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-18, Oily Waste System.

Table 2.3.3-18 Oily Waste System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial)
Flexible Hoses	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial)
Valve	Leakage Boundary (spatial)

The aging management review results for these component types are provided in Table 3.3.2-18, Auxiliary Systems – Summary of Aging Management Evaluation - Oily Waste System.

Table 2.3.3-20 Turbine Building HVAC System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Damper	Fire Barrier Pressure Boundary
Ductwork	Pressure Boundary
Flex Connector	Pressure Boundary

The aging management review results for these component types are provided in Table 3.3.2-20, Auxiliary Systems – Summary of Aging Management Evaluation - Turbine Building HVAC System.

2.3.3.21 Miscellaneous Auxiliary Systems in-scope ONLY for Criterion 10 CFR 54.4(a)(2)

Auxiliary systems within the scope of license renewal based upon the criterion of 10CFR54.4(a)(2) were identified using the methods described in section 2.1.2.2. A review of each mechanical system was performed to identify nonsafety-related systems or nonsafety-related portions of safety-related systems with the potential for adverse spatial interaction with safety-related systems or components. Components subject to aging management review due only to scoping criterion 10 CFR 54.4(a)(2) are evaluated in this section.

The following auxiliary systems are within the scope of license renewal only based on the criterion of 10 CFR 54.4(a)(2):

- Service water system
- Essential service water chemical addition system
- Chemical and detergent waste system
- Gaseous radwaste system
- Demineralized water makeup storage and transfer system
- Domestic water system
- Plant heating system
- Boron recycle system
- Central chilled water system

- Yard drainage system
- Secondary liquid waste system
- Roof drains system

System Descriptions/System Functions

Essential Service Water Chemical Addition System

The purpose of the essential service water chemical addition system is to provide for the chemical treatment of the essential service water system to prevent organic fouling. The essential service water chemical addition system consists of pumps, piping (including a connection to accommodate a temporary chemical source), valves, and associated controls and instrumentation.

The non-safety-related essential service water chemical addition system contains components that are within the scope of license renewal for providing structural integrity to attached safety-related essential service water piping

Service Water System

The purpose of the non-safety-related service water system is to provide cooling water to plant auxiliary equipment during normal plant operations and normal plant shutdown and transfer the heat to the circulating water system (CWS) and the ultimate heat sink (UHS). The service water system also provides cooling water to the safety-related essential service water (ESW) system during normal operation. The essential service water system is automatically isolated from the service water system in response to design basis events. The UHS then supplies cooling water to the ESW system by the safety-related ESW pumps that are part of the essential service water system. The service water system consists of piping, valves, and instrumentation. The water supply and motive force for the system is provided by the plant service water system.

The non-safety-related service water system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the chemical and volume control system chiller area of the auxiliary building. The service water system also provides structural integrity (attached) to essential service water system piping in the control building.

Chemical and Detergent Waste System

The purpose of the chemical and detergent waste system is to collect chemical, washdown, and detergent waste from plant facilities and transfer the waste for processing and recycling. The chemical and detergent waste system consists of a drain tank, pumps, piping, strainers, valves, and associated instrumentation and controls.

The non-safety related chemical and detergent waste system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the control building.

Gaseous Radwaste System

The purpose of the gaseous radwaste system is to control, collect, process, store and dispose of gaseous radioactive wastes generated as a result of normal operation, including anticipated operational occurrences. This system is composed of multiple compressors, valves, piping runs, tanks, gaseous recombiners and instruments.

The non-safety-related gaseous radwaste system contains components that are within the scope of license renewal for providing structural integrity to attached safety related equipment in the auxiliary building.

Demineralized Water Makeup Storage and Transfer System

The purpose of the demineralized water makeup storage and transfer system is to store water for use upon demand for makeup within the plant. This system is composed of multiple pumps, valves, tanks, piping runs, and vents.

The non-safety-related demineralized water makeup storage and transfer system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the diesel generator building, the auxiliary building and the fuel building.

Domestic Water System

The domestic water system includes the potable water system. The purpose of the non-safety related domestic water system is to provide chlorinated potable water for drinking, cooking, and for showers, laundry, and toilet facilities within the standardized power block. The domestic water system consists of tanks, pumps, piping, tubing, valves, and plumbing fixtures.

The non-safety related domestic water system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the auxiliary, control, and fuel buildings.

Plant Heating System

The purpose of the plant heating system is to serve as the heating medium for air to provide a suitable environment for personnel and equipment. The plant heating system is composed of redundant hot-water pumps, a steam-to-water heat exchanger, and a supply and return piping system.

The non-safety-related plant heating system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the auxiliary building and fuel building.

Boron Recycle System

The purpose of the boron recycle system is to receive reactor coolant effluent for the purpose of storage until it can either be reused or disposed of by processing it through the liquid radwaste system. The boron recycle system receives effluent from the volume control tank, the reactor coolant drain tank, the waste holdup tank and the pressure relief tank. This system is composed of multiple demineralizers, drains, tanks, pumps, valves and piping runs.

The non-safety-related boron recycle system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the auxiliary building. The system also provides structural integrity (attached) to safety related equipment in the auxiliary building.

Central Chilled Water System

The central chilled water system provides cooling for air handling equipment so that plant ventilation can maintain a suitable environment for personnel and equipment.

The non-safety-related central chilled water system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the auxiliary building, fuel building, and control building.

Yard Drainage System

The purpose of the yard drainage system is to transfer accumulated water in-leakage from various below grade electrical manholes, the essential service water "B" train valve house, and the turbine building cable pit sump to the site storm drainage system. The yard drainage system consists of pumps, piping, valves, and associated instrumentation and controls.

The non-safety related yard drainage system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the essential service water "B" train valve house.

Secondary Liquid Waste System

The purpose of the secondary liquid waste system is to process and recycle the recyclable turbine building waste and condensate demineralizer regeneration waste products back to the condenser or discharge the waste to the environment if within the limits of release. The secondary liquid waste system includes cross-connections with the steam generator blowdown system to provide improved reliability by providing back-up demineralization capability.

The non-safety-related secondary liquid waste system contains components whose failure could prevent the satisfactory accomplishment of a safety-related function for systems, structures, and components (spatial interaction) in the auxiliary building.

Roof Drains System

The roof drains system collects water resulting from precipitation on site building roofs. The collected rainwater is conveyed by gravity to the site storm drainage system.

WCGS USAR References

Additional details of the service water system are included in USAR Sections 9.2.1.1 and 9.2.1.2.

Additional details of the essential service water chemical addition system are included in USAR Section 9.2.1.2.

Additional details of the chemical and detergent waste system are included in USAR Section 9.3.3.2.1.1.

Additional details of the gaseous radwaste system are included in USAR Section 11.3.

Additional details of the demineralized water storage makeup and transfer system are included in USAR Section 9.2.3.

Additional details of the domestic water system are included in USAR Section 9.2.4.

Additional details of the plant heating system are provided in USAR Section 9.4.9.

Additional details of the boron recycle system are included in USAR Section 9.3.6.

Additional details of the central chilled water system are included in USAR Section 9.4.10.

The yard drainage system is not discussed in the USAR.

Additional details of the secondary liquid waste system are included in USAR Section 10.4.10.

Additional details of the roof drains system are included in USAR Section 9.3.3.2.

License Renewal Drawings

The license renewal drawing for the service water system is listed below:

LR-WCGS-EA-M-12EA01

The license renewal drawing for the essential service water chemical addition system is listed below:

LR-WCGS-KT-M-K2KT01

The license renewal drawing for the chemical and detergent waste system is listed below:

LR-WCGS-LD-M-12LD01

The license renewal drawings for the gaseous radwaste system are listed below:

LR-WCGS-HA-M-12HA01
LR-WCGS-HA-M-12HA03

The license renewal drawing for the demineralized water makeup storage and transfer system is listed below:

LR-WCGS-AN-M-12AN01

The license renewal drawings for the domestic water system are listed below:

LR-WCGS-KD-M-12KD01
LR-WCGS-KD-M-12KD02

The license renewal drawing for the plant heating system is listed below:

LR-WCGS-GA-M-12GA02

The license renewal drawings for the boron recycle system are listed below:

LR-WCGS-HE-M-12HE01
LR-WCGS-HE-M-12HE03

The license renewal drawing for the central chilled water system is listed below:

LR- WCGS-GB-M-12GB01

The license renewal drawing for the yard drainage system is listed below:

LR-WCGS-LC-M-12LC01

The license renewal drawings for secondary liquid waste system are listed below:

LR-WCGS-HF-M-12HF01
LR-WCGS-HF-M-12HF02
LR-WCGS-HF-M-12HF03

The license renewal drawings for roof drains system are listed below:

LR-WCGS-LB-M-03LB08
LR-WCGS-LB-M-03LB11
LR-WCGS-LB-M-13LB01
LR-WCGS-LB-M-13LB02
LR-WCGS-LB-M-13LB06
LR-WCGS-LB-M-13LB07

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.3-21, Miscellaneous Auxiliary Systems In-Scope ONLY based on Criterion 10 CFR 54.4(a)(2).

Table 2.3.3-21 Miscellaneous Auxiliary Systems In-Scope ONLY based on Criterion 10 CFR 54.4(a)(2)

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Structural Integrity (attached)
Flow element	Leakage Boundary (spatial) Structural Integrity (attached)
Orifice	Leakage Boundary (spatial)
Piping	Leakage Boundary (spatial) Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Strainer	Leakage Boundary (spatial)
Tank	Leakage Boundary (spatial)
Tubing	Leakage Boundary (spatial)
Valve	Leakage Boundary (spatial) Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.3.2-21, Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on Criterion 10 CFR 54.4(a)(2).

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.4-1, Main Turbine System.

Table 2.3.4-1 Main Turbine System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Piping	Pressure Boundary
Tubing	Pressure Boundary
Valve	Pressure Boundary

The aging management review results for these component types are provided in Table 3.4.2-1, Steam and Power Conversion System – Summary of Aging Management Evaluation - Main Turbine System.

2.3.4.2 Main Steam System

System Description

The main steam system includes the auxiliary steam sub-system and the auxiliary turbines sub-system. The main steam system consists of the piping systems that convey steam from the steam generators to the turbine-generator system, the branches that supply steam to the main feedwater pump turbines, auxiliary feedwater pump turbine, reheaters, and main turbine gland seals. Each main steam line is equipped with one power-operated atmospheric relief valves (ARV), five spring-loaded safety valves, one main steam isolation valves (MSIV) and its bypass, a cross-tie header downstream of the MSIVs, and the associated vent/drain valves. The steam piping system from the MSIVs to the main turbine is evaluated with the main turbine system. The steam to the main turbine gland seals is evaluated in turbine/generator auxiliaries.

The turbine bypass system, also called the steam dump system, is part of the main steam system and has the capability to bypass main steam from the steam generators to the main condenser to minimize transient effects on the reactor coolant system of startup, hot shutdown, cooldown, and load reduction.

The auxiliary steam sub-system is designed to provide the steam required for plant heating and processing during plant startup, complete shutdown, and normal operation. The system consists of steam distribution headers and condensate return/makeup equipment. The auxiliary turbines sub-system consists of the branches downstream of the isolation valves that supply steam to the main feedwater pump turbines and auxiliary feedwater pump turbine.

Table 2.3.4-2 Main Steam System

Component Type	Intended Function
Closure Bolting	Leakage Boundary (spatial) Pressure Boundary
Flexible Hoses	Leakage Boundary (spatial)
Insulation	Insulate
Orifice	Leakage Boundary (spatial) Pressure Boundary Throttle
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Pump	Leakage Boundary (spatial)
Sight Gauge	Leakage Boundary (spatial)
Silencer	Direct Flow
Strainer	Filter Leakage Boundary (spatial) Pressure Boundary
Tank	Leakage Boundary (spatial)
Trap	Leakage Boundary (spatial) Pressure Boundary
Tubing	Pressure Boundary
Turbine	Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.4.2-2, Steam and Power Conversion System – Summary of Aging Management Evaluation - Main Steam System.

2.3.4.3 Feedwater System

System Description

The purpose of the feedwater system is to receive condensate from the condensate system and deliver feedwater at required pressure and temperature to the four steam generators. The

Table 2.3.4-4 Condensate System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Piping	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)
Rupture Disc	Pressure Boundary
Tank	Pressure Boundary
Valve	Leakage Boundary (spatial) Pressure Boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.4.2-4, Steam and Power Conversion System – Summary of Aging Management Evaluation - Condensate System.

2.3.4.5 Steam Generator Blowdown System

System Description

The steam generator blowdown system (SGBS) provides continuous blowdown of water from the lower portion of each steam generator secondary side to remove solids and chemical contaminates that accumulate in the steam generators during normal operations. The blowdown from each steam generator flows under pressure to a blowdown flash tank. The discharge from the flash tank flows to a series of heat exchangers where the temperature is reduced prior to processing the effluent.

System Function

Portions of the SGBS provide steam generator isolation capability to maintain a heat sink for safe shutdown. Portions of the SGBS provide containment isolation for steam generator drain piping penetration P-78. Portions of the SGBS contain non-safety-related components that are spatially oriented such that their failure could prevent the satisfactory accomplishment of a safety-related function associated with a safety-related component. Portions of the SGBS attach to safety-related piping such that their structural failure could prevent satisfactory accomplishment of safety-related system functions.

The SGBS is in the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1). Portions are in scope as non-safety-related components affecting the structural integrity of safety-related components based on the criterion of 10 CFR 54.4(a)(2). Portions of the

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.3.4-6, Auxiliary Feedwater System.

Table 2.3.4-6 Auxiliary Feedwater System

Component Type	Intended Function
Closure Bolting	Pressure Boundary
Filter	Filter Pressure Boundary
Heat Exchanger Shell Side Auxiliary Feed Pump Turbine Lube Oil Cooler Shell (HX # 154)	Pressure Boundary
Heat Exchanger Tube Side AF Pump Turbine Lube Oil Cooler Head (HX # 155) AF Pump Turbine Lube Oil Cooler Tube Sheet (HX # 156) AF Pump Turbine Lube Oil Cooler Tubes (HX # 157)	Heat Transfer Pressure Boundary
Orifice	Pressure Boundary Throttle
Piping	Pressure Boundary Structural Integrity (attached)
Pump	Pressure Boundary
Spacer Ring	Pressure Boundary
Tubing	Pressure Boundary
Turbine	Pressure Boundary
Valve	Pressure Boundary Structural Integrity (attached)

The aging management review results for these component types are provided in Table 3.4.2-6, Steam and Power Conversion System – Summary of Aging Management Evaluation - Auxiliary Feedwater System.

Reactor Coolant Pump Supports

Three individual columns provide the vertical support for each pump. Lateral support for seismic and blowdown loading is provided by three lateral tension tie bars.

Table 2.4-23, Component Types Assigned to Building/Structures is provided to identify support component types by building/structure.

Structure Functions

Structural supports are in the scope of license renewal because they support and protect components that are within the scope of license renewal. Safety related supports meet the criteria of 10 CFR 54.4(a)(1). Non-safety related supports meet the criterion of 10 CFR 54.4(a)(2) when they prevent interaction between safety-related and non-safety related components. Other supports meet the criteria of 10 CFR 54.4(a)(3) because they provide support for components credited for fire protection, station blackout, or pressurized thermal shock.

WCGS USAR References

Additional details of supports are included in USAR Section 5.4.14.2.

Component-Function Relationship Table

The component types subject to aging management review are indicated in Table 2.4-22, Supports.

Table 2.4-22 Supports

Component Type	Intended Function
Cable Trays and Supports	Nonsafety-related Structural Support Structural Support
Conduit and Supports	Nonsafety-related Structural Support Shelter, Protection Structural Support
Electrical Panels and Enclosures	Nonsafety-related Structural Support Shelter, Protection Structural Support
High Strength Bolting	Structural Support
Spring Hangers	Structural Support
Supports ASME 1	Structural Support

Table 2.4-22 Supports (Continued)

Component Type	Intended Function
Supports ASME 2 and 3	Nonsafety-related Structural Support Structural Support
Supports HVAC Duct	Structural Support
Supports, Instrument	Nonsafety-related Structural Support Structural Support
Supports, Insulation	Nonsafety-related Structural Support
Supports, Mechanical Equipment Class 1	Structural Support
Supports, Mechanical Equipment Class 2 and 3	Nonsafety-related Structural Support Structural Support
Supports, Mechanical Equipment Non-ASME	Nonsafety-related Structural Support Structural Support
Supports, Non-ASME	Expansion/Separation Nonsafety-related Structural Support Structural Support

The aging management review results for these component types are provided in Table 3.5.2-22, Containments, Structures, and Component Supports - Summary of Aging Management Evaluation – Supports.

Table 2.4-23 Component Types Assigned to Supports by Building/Structure

Component Types Assigned to Supports	Electrical Components			Mechanical Components							
	Cable Trays and Supports	Conduits and Supports	Electrical Panels and Enclosures	ASME Class 1 Pipe Supports	ASME Class 2 and 3 Pipe Supports	Non-ASME Pipe Supports	Mechanical Equipment Code Supports	Mechanical Equipment Non-Code Supports	HVAC Duct Supports	Instrument Supports	Insulation Supports
Reactor Building	X	X	X	X	X	X	X	X	X	X	X
Control Building	X	X	X		X	X		X	X	X	X
Diesel Generator Bldg	X	X	X		X	X	X		X	X	X
Turbine Building	X	X	X			X		X		X	
Radwaste Building	X	X	X			X					
Auxiliary Building	X	X	X		X	X	X	X	X	X	X
Emer. Fuel Oil Tank Access Vaults		X	X							X	
ESW Elec. Ductbanks and Manways	X										
Communications Corridor											
Transmission Towers											
ESW Access Vaults											
Fuel Building	X	X	X		X	X	X	X	X	X	X
ESW Pumphouse	X	X	X		X	X	X		X	X	X
CW Screenhouse	X	X	X			X		X		X	
Ultimate Heat Sink											
Main Dam/Aux Spillway											
ESW Valve House		X	X					X		X	
Refueling Water Storage Tank Fnd		X	X							X	
Condensate Water Storage Tank Fnd		X	X			X				X	
Concrete Supports for Station Transformers	X	X	X								

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insignificant for any type flaw which might exist at the clad-base metal interface...." Since the evaluation was for the extended licensed operating period rather than for the current licensed operating period, this analysis is not a TLAA, by 10 CFR 54.3(a) criterion (3). It should also validate any existing TLAAs, within its analysis parameters, on this question.

However no underclad flaws have been detected or analyzed for the WCGS vessel, in the absence of which there are no other TLAAs of this sort. See Section 4.7.2.

3.1.2.2.6 Loss of Fracture Toughness due to Neutron Irradiation Embrittlement and Void Swelling

Loss of fracture toughness due to neutron irradiation embrittlement and void swelling for nickel alloy and stainless steel reactor internals components exposed to reactor coolant will be managed by (1) participating in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluating and implementing the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submitting an inspection plan for reactor internals to the NRC for review and approval (See Reactor Coolant System Supplement (B2.1.35)).

3.1.2.2.7 Cracking due to Stress Corrosion Cracking

3.1.2.2.7.1 PWR stainless steel reactor vessel instrument tubes and bottom-mounted flux thimble guide tubes

For managing the aging of cracking due to stress corrosion cracking for stainless steel components exposed to reactor coolant, Water Chemistry (B2.1.2) will be augmented by ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) to ensure that adequate inspection methods ensure detection of cracks.

3.1.2.2.7.2 CASS reactor coolant system piping and components exposed to reactor coolant

For managing the aging of cracking due to stress corrosion cracking for cast austenitic stainless steel piping components exposed to reactor coolant, Water Chemistry (B2.1.2) program will be augmented by ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) to ensure that adequate inspection methods ensure detection of cracks. The CASS in the RCS piping at WCGS meets the NUREG-0313 requirements for ferrite content but not for carbon content.

A flaw evaluation methodology for CASS components is not necessary because WCGS CASS piping is not susceptible to thermal aging embrittlement. Based on a review of Certified Material Test Reports, the Mo and ferrite values for these components are below the industry accepted thermal aging embrittlement significance threshold (<0.5% Mo, <20% ferrite).

3.1.2.2.13 Cracking due to Primary Water Stress Corrosion Cracking (PWSCC)

For managing the aging of cracking due to primary water stress corrosion cracking of nickel alloy components exposed to reactor coolant, water chemistry and inservice inspection will be augmented by the plant-specific Nickel Alloy aging management program (B2.1.34) (pressure boundary components, reactor vessel core support lugs, and steam generator primary side internals only), and by implementing applicable (1) NRC Orders, Bulletins and Generic Letters associated with nickel alloys and (2) staff-accepted industry guidelines, (3) participate in the industry programs, such as EPRI MRP, for managing aging effects associated with nickel alloys, (4) upon completion of these programs, but not less than 24 months before entering the period of extended operation, WCNOC will submit an inspection plan for reactor coolant system nickel alloy pressure boundary components to the NRC for review and approval, (See Reactor Coolant System Supplement (B2.1.35)).

3.1.2.2.14 Wall Thinning due to Flow-Accelerated Corrosion

Feedring wall thinning was described in NRC Information Notice 91-19. Evaluation of this condition is not applicable to WCGS and no action is required, however, the Water Chemistry program (B2.1.2) and the Steam Generator Tube Integrity program (B2.1.8) are conservatively credited to manage wall thinning due to flow-accelerated corrosion for the feedring.

3.1.2.2.15 Changes in dimensions due to Void Swelling

Changes in dimensions due to void swelling for nickel alloy and stainless steel reactor internals components exposed to reactor coolant will be managed by (1) participating in the industry programs for investigating and managing aging effects on reactor internals; (2) evaluating and implementing the results of the industry programs as applicable to the reactor internals; and (3) upon completion of these programs, but not less than 24 months before entering the period of extended operation, submitting an inspection plan for reactor internals to the NRC for review and approval (See Reactor Coolant System Supplement (B2.1.35)).

3.1.2.2.16 Cracking due to Stress Corrosion Cracking and Primary Water Stress Corrosion Cracking

3.1.2.2.16.1 Cracking on steam generator heads, tubesheets, control rod drive head penetration housings and welds

These control rod drive mechanism housings are stainless steel for WCGS, therefore no additional commitments or further evaluation is required. WCGS has a recirculating steam generator, not a once-through steam generator, so the further evaluation for steam generator components is not applicable to WCGS.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.01	Steel pressure vessel support skirt and attachment welds	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	This is a Westinghouse vessel with no support skirt, so the applicable NUREG-1801 line was not used.
3.1.1.02					Not applicable - BWR only
3.1.1.03					Not applicable - BWR only
3.1.1.04					Not applicable - BWR only
3.1.1.05	Stainless steel and nickel alloy reactor vessel internals components	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of metal components is a TLAA. See further evaluation in subsection 3.1.2.2.1.
3.1.1.06	Nickel Alloy tubes and sleeves in a reactor coolant and secondary feedwater/steam environment	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Cumulative fatigue damage of steam generator tubes is not a TLAA as defined in 10 CFR 54.3. See further evaluation 3.1.2.2.1

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.07	Steel and stainless steel reactor coolant pressure boundary closure bolting, head closure studs, support skirts and attachment welds, pressurizer relief tank components, steam generator components, piping and components external surfaces and bolting	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of metal components is a TLAA. However the pressurizer relief tank components and all other Class 2, 3, and Quality Group D components (except piping) have no fatigue or cyclic design TLAAs. See further evaluation in subsection 3.1.2.2.1.
3.1.1.08	Steel; stainless steel; and nickel-alloy reactor coolant pressure boundary piping, piping components, piping elements; flanges; nozzles and safe ends; pressurizer vessel shell heads and welds; heater sheaths and sleeves; penetrations; and thermal sleeves	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA	Fatigue of metal components is a TLAA. See further evaluation in subsection 3.1.2.2.1.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.09	Steel; stainless steel; steel with nickel-alloy or stainless steel cladding; nickel-alloy reactor vessel components: flanges; nozzles; penetrations; pressure housings; safe ends; thermal sleeves; vessel shells, heads and welds	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA	Fatigue of metal components is a TLAA. See further evaluation in subsection 3.1.2.2.1.
3.1.1.10	Steel; stainless steel; steel with nickel-alloy or stainless steel cladding; nickel-alloy steam generator components (flanges; penetrations; nozzles; safe ends, lower heads and welds)	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c) and environmental effects are to be addressed for Class 1 components	Yes, TLAA	Fatigue of metal components is a TLAA. See further evaluation in subsection 3.1.2.2.1.
3.1.1.11					Not applicable - BWR only
3.1.1.12	Steel steam generator shell assembly exposed to secondary feedwater and steam	Loss of material due to general, pitting and crevice corrosion	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	Yes	Not applicable. WCGS has a recirculating steam generator, not a once-through steam generator, so the applicable NUREG-1801 line was not used.
3.1.1.13					Not applicable - BWR only
3.1.1.14					Not applicable - BWR only
3.1.1.15					Not applicable - BWR only

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.16	Steel steam generator upper and lower shell and transition cone exposed to secondary feedwater and steam	Loss of material due to general, pitting and crevice corrosion	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), and Water Chemistry (B2.1.2) and, for Westinghouse Model 44 and 51 S/G, if general and pitting corrosion of the shell is known to exist, additional inspection procedures are to be developed.	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.2.4.
3.1.1.17	Steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds	Loss of fracture toughness due to neutron irradiation embrittlement	TLAA, evaluated in accordance with Appendix G of 10 CFR Part 50 and RG 1.99. The applicant may choose to demonstrate that the materials of the nozzles are not controlling for the TLAA evaluations.	Yes, TLAA	Predicted loss of fracture toughness due to neutron irradiation embrittlement is a TLAA. See further evaluation in subsection 3.1.2.2.3.1.
3.1.1.18	Steel (with or without stainless steel cladding) reactor vessel beltline shell, nozzles, and welds; safety injection nozzles	Loss of fracture toughness due to neutron irradiation embrittlement	Reactor Vessel Surveillance (B2.1.15)	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.1.2.2.3.2.
3.1.1.19					Not applicable - BWR only
3.1.1.20					Not applicable - BWR only

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.21	Reactor vessel shell fabricated of SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process	Crack growth due to cyclic loading	TLAA	Yes, TLAA	Crack growth due to cyclic loading is a TLAA. See further evaluation in subsection 3.1.2.2.5.
3.1.1.22	Stainless steel and nickel alloy reactor vessel internals components exposed to reactor coolant and neutron flux	Loss of fracture toughness due to neutron irradiation embrittlement, void swelling	FSAR commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation. (B2.1.35)	No	Consistent with NUREG-1801. See further evaluation in subsection 3.1.2.2.6.
3.1.1.23	Stainless steel reactor vessel closure head flange leak detection line and bottom-mounted instrument guide tubes	Cracking due to stress corrosion cracking	A plant-specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.7.1. The reactor vessel O-ring leak monitoring tubes are made of nickel alloy.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.24	Class 1 cast austenitic stainless steel piping, piping components, and piping elements exposed to reactor coolant	Cracking due to stress corrosion cracking	Water Chemistry (B2.1.2) and, for CASS components that do not meet the NUREG-0313 guidelines, a plant specific aging management program	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2). Water Chemistry (B2.1.2) will be augmented with ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) because the CASS in the reactor coolant system piping at WCGS meets the NUREG-0313 requirements for ferrite content but not for carbon content. See further evaluation in subsection 3.1.2.2.7.2.
3.1.1.25					Not applicable - BWR only
3.1.1.26					Not applicable - BWR only

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.27	Stainless steel and nickel alloy reactor vessel internals screws, bolts, tie rods, and hold-down springs	Loss of preload due to stress relaxation	FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation. (B2.1.35)	No	Consistent with NUREG-1801. See further evaluation in subsection 3.1.2.2.9.
3.1.1.28	Steel steam generator feedwater impingement plate and support exposed to secondary feedwater	Loss of material due to erosion	A plant-specific aging management program is to be evaluated.	Yes	Not applicable. WCGS steam generator does not have an impingement plate, so the applicable NUREG-1801 line was not used.
3.1.1.29					Not applicable - BWR only

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.30	Stainless steel reactor vessel internals components (e.g., Upper internals assembly, RCCA guide tube assemblies, Baffle/former assembly, Lower internal assembly, shroud assemblies, Plenum cover and plenum cylinder, Upper grid assembly, Control rod guide tube (CRGT) assembly, Core support shield assembly, Core barrel assembly, Lower grid assembly, Flow distributor assembly, Thermal shield, Instrumentation support structures)	Cracking due to stress corrosion cracking, irradiation-assisted stress corrosion cracking	Water Chemistry (B2.1.2) and FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation. (B2.1.35).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.12.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.31	Nickel alloy and steel with nickel-alloy cladding piping, piping component, piping elements, penetrations, nozzles, safe ends, and welds (other than reactor vessel head); pressurizer heater sheaths, sleeves, diaphragm plate, manways and flanges; core support pads/core guide lugs	Cracking due to primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1) and Water Chemistry (B2.1.2) and for nickel alloy, comply with applicable NRC Orders and provide a commitment in the FSAR supplement to implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines. (B2.1.35).	No	Consistent with NUREG-1801 ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1), Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35) are credited and augmented by Nickel Alloy Aging Management (B2.1.34) for nickel components. See further evaluation in subsection 3.1.2.2.13.
3.1.1.32	Steel steam generator feedwater inlet ring and supports	Wall thinning due to flow-accelerated corrosion	A plant-specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.14.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.33	Stainless steel and nickel alloy reactor vessel internals components	Changes in dimensions due to void swelling	FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation. (B2.1.35).	No	Consistent with NUREG-1801. See further evaluation in subsection 3.1.2.2.15.
3.1.1.34	Stainless steel and nickel alloy reactor control rod drive head penetration pressure housings	Cracking due to stress corrosion cracking and primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1) and Water Chemistry (B2.1.2) and for nickel alloy, comply with applicable NRC Orders and provide a commitment in the FSAR supplement to implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines. (B2.1.35).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.16.1.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.35	Steel with stainless steel or nickel alloy cladding primary side components; steam generator upper and lower heads, tubesheets and tube-to-tube sheet welds	Cracking due to stress corrosion cracking and primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1) and Water Chemistry (B2.1.2) and for nickel alloy, comply with applicable NRC Orders and provide a commitment in the FSAR supplement to implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines.	No	Not applicable. WCGS has a recirculating steam generator, not a once-through steam generator, so the applicable NUREG-1801 line was not used.
3.1.1.36	Nickel alloy, stainless steel pressurizer spray head	Cracking due to stress corrosion cracking and primary water stress corrosion cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16) and, for nickel alloy welded spray heads, comply with applicable NRC Orders and provide a commitment in the FSAR supplement to implement applicable (1) Bulletins and Generic Letters and (2) staff-accepted industry guidelines. (B2.1.35).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.16.2.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.37	Stainless steel and nickel alloy reactor vessel internals components (e.g., Upper internals assembly, RCCA guide tube assemblies, Lower internal assembly, CEA shroud assemblies, Core shroud assembly, Core support shield assembly, Core barrel assembly, Lower grid assembly, Flow distributor assembly)	Cracking due to stress corrosion cracking, primary water stress corrosion cracking, irradiation-assisted stress corrosion cracking	Water Chemistry (B2.1.2) and FSAR supplement commitment to (1) participate in industry RVI aging programs (2) implement applicable results (3) submit for NRC approval > 24 months before the extended period an RVI inspection plan based on industry recommendation. (B2.1.35).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2). See further evaluation in subsection 3.1.2.2.17.
3.1.1.38					Not applicable - BWR only
3.1.1.39					Not applicable - BWR only
3.1.1.40					Not applicable - BWR only
3.1.1.41					Not applicable - BWR only
3.1.1.42					Not applicable - BWR only
3.1.1.43					Not applicable - BWR only
3.1.1.44					Not applicable - BWR only
3.1.1.45					Not applicable - BWR only
3.1.1.46					Not applicable - BWR only
3.1.1.47					Not applicable - BWR only
3.1.1.48					Not applicable - BWR only
3.1.1.49					Not applicable - BWR only
3.1.1.50					Not applicable - BWR only
3.1.1.51					Not applicable - BWR only

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.52	Steel and stainless steel reactor coolant pressure boundary (RCPB) pump and valve closure bolting, manway and holding bolting, flange bolting, and closure bolting in high-pressure and high-temperature systems	Cracking due to stress corrosion cracking, loss of material due to wear, loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity (B2.1.7)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Bolting Integrity (B2.1.7).
3.1.1.53	Steel piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to general, pitting and crevice corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).
3.1.1.54	Copper alloy piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.55	Cast austenitic stainless steel Class 1 pump casings, and valve bodies and bonnets exposed to reactor coolant >250°C (>482°F)	Loss of fracture toughness due to thermal aging embrittlement	Inservice inspection (IWB, IWC, and IWD) (B2.1.1). Thermal aging susceptibility screening is not necessary, inservice inspection requirements are sufficient for managing these aging effects. ASME Code Case N-481 also provides an alternative for pump casings.	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1).
3.1.1.56	Copper alloy >15% Zn piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials (B2.1.17)	No	Not applicable. WCGS has no in scope copper alloy >15% Zn components exposed to closed cycle cooling water in the reactor coolant system, so the applicable NUREG-1801 line was not used.
3.1.1.57	Cast austenitic stainless steel Class 1 piping, piping component, and piping elements and control rod drive pressure housings exposed to reactor coolant >250°C (>482°F)	Loss of fracture toughness due to thermal aging embrittlement	Thermal Aging Embrittlement of CASS	No	Exception to NUREG-1801. Aging effect in NUREG-1801 for this material and environment combination is not applicable because the Mo and ferrite values for these components are below the industry accepted thermal aging embrittlement significance threshold (<0.5% Mo, <20% ferrite).
3.1.1.58	Steel reactor coolant pressure boundary 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 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.59	Steel steam generator steam nozzle and safe end, feedwater nozzle and safe end, AFW nozzles and safe ends exposed to secondary feedwater/steam	Wall thinning due to flow-accelerated corrosion	Flow-Accelerated Corrosion (B2.1.6)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Flow-Accelerated Corrosion (B2.1.6).
3.1.1.60	Stainless steel flux thimble tubes (with or without chrome plating)	Loss of material due to Wear	Flux Thimble Tube Inspection (B2.1.21)	No	Consistent with NUREG-1801.
3.1.1.61	Stainless steel, steel pressurizer integral support exposed to air with metal temperature up to 288°C (550°F)	Cracking due to cyclic loading	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1).
3.1.1.62	Stainless steel, steel with stainless steel cladding reactor coolant system cold leg, hot leg, surge line, and spray line piping and fittings exposed to reactor coolant	Cracking due to cyclic loading	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.63	Steel reactor vessel flange, stainless steel and nickel alloy reactor vessel internals exposed to reactor coolant (e.g., upper and lower internals assembly, CEA shroud assembly, core support barrel, upper grid assembly, core support shield assembly, lower grid assembly)	Loss of material due to Wear	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1).
3.1.1.64	Stainless steel and steel with stainless steel or nickel alloy cladding pressurizer components	Cracking due to stress corrosion cracking, primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2).
3.1.1.65	Nickel alloy reactor vessel upper head and control rod drive penetration nozzles, instrument tubes, head vent pipe (top head), and welds	Cracking due to primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1) and Water Chemistry (B2.1.2) and Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors (B2.1.5)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.66	Steel steam generator secondary manways and handholds (cover only) exposed to air with leaking secondary-side water and/or steam	Loss of material due to erosion	Inservice Inspection (IWB, IWC, and IWD) for Class 2 components (B2.1.1)	No	Not applicable. WCGS has a recirculating steam generator, not a once-through steam generator, so the applicable NUREG-1801 line was not used.
3.1.1.67	Steel with stainless steel or nickel alloy cladding; or stainless steel pressurizer components exposed to reactor coolant	Cracking due to cyclic loading	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.68	Stainless steel, steel with stainless steel cladding Class 1 piping, fittings, pump casings, valve bodies, nozzles, safe ends, manways, flanges, CRD housing; pressurizer heater sheaths, sleeves, diaphragm plate; pressurizer relief tank components, reactor coolant system cold leg, hot leg, surge line, and spray line piping and fittings	Cracking due to stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions for ASME Section XI stainless steel components in reactor coolant. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2). Consistent with NUREG-1801 except a different aging management program, Water Chemistry (B2.1.2) only, is credited for non-ASME Section XI components associated with the pressurizer relief tank. ASME Section XI Inservice Inspection will not be used to manage aging because the components associated with the pressurizer relief tank are non-ASME components and are not subject to ASME Section XI Inservice Inspection requirements.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.69	Stainless steel, nickel alloy safety injection nozzles, safe ends, and associated welds and buttering exposed to reactor coolant	Cracking due to stress corrosion cracking, primary water stress corrosion cracking	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions for stainless steel components in reactor coolant. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2). Consistent with NUREG-1801 except a different aging management program, Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35), is credited for nickel alloy components in reactor coolant. The plant-specific Nickel Alloy Aging Management program is also credited for primary water stress corrosion cracking.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.70	Stainless steel; steel with stainless steel cladding Class 1 piping, fittings and branch connections < NPS 4 exposed to reactor coolant	Cracking due to stress corrosion cracking, thermal and mechanical loading	Inservice Inspection (IWB, IWC, and IWD) (B2.1.1), Water chemistry (B2.1.2), and One-Time Inspection of ASME Code Class 1 Small-bore Piping (B2.1.19)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2), One-Time Inspection Of ASME Code Class 1 Small-Bore Piping (B2.1.19).
3.1.1.71	High-strength low alloy steel closure head stud assembly exposed to air with reactor coolant leakage	Cracking due to stress corrosion cracking; loss of material due to wear	Reactor Head Closure Studs(B2.1.3)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Reactor Head Closure Studs (B2.1.3).
3.1.1.72	Nickel alloy steam generator tubes and sleeves exposed to secondary feedwater/ steam	Cracking due to OD stress corrosion cracking and intergranular attack, loss of material due to fretting and wear	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2), Steam Generator Tube Integrity (B2.1.8).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.73	Nickel alloy steam generator tubes, repair sleeves, and tube plugs exposed to reactor coolant	Cracking due to primary water stress corrosion cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2), Steam Generator Tube Integrity (B2.1.8).
3.1.1.74	Chrome plated steel, stainless steel, nickel alloy steam generator anti-vibration bars exposed to secondary feedwater/ steam	Cracking due to stress corrosion cracking, loss of material due to crevice corrosion and fretting	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2), Steam Generator Tube Integrity (B2.1.8).
3.1.1.75	Nickel alloy once-through steam generator tubes exposed to secondary feedwater/ steam	Denting due to corrosion of carbon steel tube support plate	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Not applicable. WCGS has a recirculating steam generator, not a once-through steam generator, so the applicable NUREG-1801 line was not used.
3.1.1.76	Steel steam generator tube support plate, tube bundle wrapper exposed to secondary feedwater/steam	Loss of material due to erosion, general, pitting, and crevice corrosion, ligament cracking due to corrosion	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2), Steam Generator Tube Integrity (B2.1.8).

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.77	Nickel alloy steam generator tubes and sleeves exposed to phosphate chemistry in secondary feedwater/ steam	Loss of material due to wastage and pitting corrosion	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Not applicable. WCGS does not use phosphate chemistry, so the applicable NUREG-1801 line was not used.
3.1.1.78	Steel steam generator tube support lattice bars exposed to secondary feedwater/ steam	Wall thinning due to flow-accelerated corrosion	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	No	Not applicable. WCGS steam generator does not contain lattice bars, so the applicable NUREG-1801 line was not used.
3.1.1.79	Nickel alloy steam generator tubes exposed to secondary feedwater/ steam	Denting due to corrosion of steel tube support plate	Steam Generator Tube Integrity (B2.1.8); Water Chemistry (B2.1.2) and, for plants that could experience denting at the upper support plates, evaluate potential for rapidly propagating cracks and then develop and take corrective actions consistent with Bulletin 88-02.	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2), Steam Generator Tube Integrity (B2.1.8). WCGS has not experienced operationally induced denting and does not expect to. The use of ferritic stainless steel support plates is expected to prevent denting for the life of the steam generator.
3.1.1.80	Cast austenitic stainless steel reactor vessel internals (e.g., upper internals assembly, lower internal assembly, CEA shroud assemblies, control rod guide tube assembly, core support shield assembly, lower grid assembly)	Loss of fracture toughness due to thermal aging and neutron irradiation embrittlement	Thermal Aging and Neutron Irradiation Embrittlement of CASS	No	Not applicable. WCGS reactor vessel internals are forged stainless steel not cast austenitic stainless steel. WCGS reactor vessel and internals are Westinghouse, not CE or B&W design, so the applicable NUREG-1801 lines were not used.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.81	Nickel alloy or nickel-alloy clad steam generator divider plate exposed to reactor coolant	Cracking due to primary water stress corrosion cracking	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2).
3.1.1.82	Stainless steel steam generator primary side divider plate exposed to reactor coolant	Cracking due to stress corrosion cracking	Water Chemistry (B2.1.2)	No	Not applicable. WCGS primary side divider plate is made of nickel alloy, so the applicable NUREG-1801 line was not used.
3.1.1.83	Stainless steel; steel with nickel-alloy or stainless steel cladding; and nickel-alloy reactor vessel internals and reactor coolant pressure boundary components exposed to reactor coolant	Loss of material due to pitting and crevice corrosion	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2).
3.1.1.84	Nickel alloy steam generator components such as, secondary side nozzles (vent, drain, and instrumentation) exposed to secondary feedwater/ steam	Cracking due to stress corrosion cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16) or Inservice Inspection (IWB, IWC, and IWD) (B2.1.1).	No	Not applicable. WCGS has recirculating steam generators, not once-through steam generators, so the applicable NUREG-1801 line was not used.
3.1.1.85	Nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external)	None	None	NA	Consistent with NUREG-1801.

Table 3.1.1 Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.1.1.86	Stainless steel piping, piping components, and piping elements exposed to air – indoor uncontrolled (External); air with borated water leakage; concrete; gas	None	None	NA	Consistent with NUREG-1801.
3.1.1.87	Steel piping, piping components, and piping elements in concrete	None	None	NA	Not applicable. WCGS has no in scope components in concrete in the reactor vessel, internals, and reactor coolant systems, so the applicable NUREG-1801 line was not used.

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals

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	High Strength Low Alloy Steel (Bolting)	Borated Water Leakage (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-4	3.1.1.07	A
RV Closure Head (Refueling seal ledge, lifting lugs, ventilation shroud support ring)	PB, SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.A2-13	3.1.1.58	A
RV Closure Head (Closure studs, nuts, washers)	PB	High Strength Low Alloy Steel (Bolting)	Borated Water Leakage (Ext)	Cracking	Reactor Head Closure Studs (B2.1.3)	IV.A2-2	3.1.1.71	B
RV Closure Head (Closure studs, nuts, washers)	PB	High Strength Low Alloy Steel (Bolting)	Borated Water Leakage (Ext)	Loss of material	Reactor Head Closure Studs (B2.1.3)	IV.A2-3	3.1.1.71	B
RV Closure Head (Closure studs, nuts, washers)	PB	High Strength Low Alloy Steel (Bolting)	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.A2-13	3.1.1.58	A
RV Closure Head (O-Ring leak monitoring tubes)`	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Closure Head (O-Ring leak monitoring tubes)`	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Closure Head (O-Ring leak monitoring tubes)`	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2), and XI.M11-A, Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors (B2.1.5)	IV.A2-18	3.1.1.65	D
RV Control Rod Drive Head Penetration (CRDM tubes)	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Control Rod Drive Head Penetration (CRDM tubes)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2), and XI.M11-A, Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors (B2.1.5)	IV.A2-9	3.1.1.65	B
RV Control Rod Drive Head Penetration (CRDM tubes)	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Control Rod Drive Head Penetration (CRDM tubes)	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Control Rod Drive Head Penetration (CRDM flange, CRDM cap, CRDM latch housing, CRDM rod travel housing)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Control Rod Drive Head Penetration (CRDM flange, CRDM cap, CRDM latch housing, CRDM rod travel housing)	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	Water Chemistry (B2.1.2) and ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.A2-11	3.1.1.34	B
RV Control Rod Drive Head Penetration (CRDM flange, CRDM cap, CRDM latch housing, CRDM rod travel housing)	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Control Rod Drive Head Penetration (CRDM flange, CRDM cap, CRDM latch housing, CRDM rod travel housing)	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Core Support Pads (Core support pads)	SS	Nickel Alloys	Reactor Coolant (Ext)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment. (B2.1.35)	IV.A2-12	3.1.1.31	E, 1
RV Core Support Pads (Core support pads)	SS	Nickel Alloys	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	D
RV Nozzle Safe Ends and Welds (Inlet nozzle safe end welds, outlet nozzle safe end welds)	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A
RV Nozzle Safe Ends and Welds (Inlet nozzle safe end welds, outlet nozzle safe end welds)	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Nozzle Safe Ends and Welds (Inlet nozzle safe end welds, outlet nozzle safe end welds)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.A2-15	3.1.1.69	E, 1
RV Nozzle Safe Ends and Welds (Inlet nozzle safe end welds, outlet nozzle safe end welds)	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Nozzle Safe Ends and Welds (Inlet nozzle safe ends, outlet nozzle safe ends)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
RV Nozzle Safe Ends and Welds (Inlet nozzle safe ends, outlet nozzle safe ends)	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Nozzle Safe Ends and Welds (Inlet nozzle safe ends, outlet nozzle safe ends)	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.A2-15	3.1.1.69	B
RV Nozzle Safe Ends and Welds (Inlet nozzle safe ends, outlet nozzle safe ends)	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.A2-13	3.1.1.58	A
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Both)	Crack growth	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-22	3.1.1.21	I, 2
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of fracture toughness	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-16	3.1.1.17	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of fracture toughness	Reactor Vessel Surveillance (B2.1.15)	IV.A2-17	3.1.1.18	A
RV Nozzles (Inlet nozzles, outlet nozzles)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Penetrations (Head vent pipe, flux thimble guide tubes penetration)	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A
RV Penetrations (Head vent pipe, flux thimble guide tubes penetration)	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Penetrations (Head vent pipe)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1), Water Chemistry (B2.1.2), and XI.M11-A, Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors (B2.1.5)	IV.A2-18	3.1.1.65	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Penetrations (Flux thimble guide tubes penetration)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.A2-19	3.1.1.31	E, 1
RV Penetrations (Head vent pipe, flux thimble guide tubes penetration)	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Penetrations (Instrument tubes (top head), high pressure conduits)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
RV Penetrations (Instrument tubes (top head), high pressure conduits)	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.A2-1	3.1.1.23	E
RV Penetrations (Instrument tubes (top head), high pressure conduits)	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Penetrations (Instrument tubes (top head), high pressure conduits)	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.A2-13	3.1.1.58	A
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Both)	Crack growth	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-22	3.1.1.21	I, 2
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of fracture toughness	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-23	3.1.1.17	A
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of fracture toughness	Reactor Vessel Surveillance (B2.1.15)	IV.A2-24	3.1.1.18	A
RV Shell (Bottom head dome, vessel shell – upper, vessel shell – intermediate, vessel shell – lower, vessel flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.A2-25	3.1.1.63	B
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.A2-13	3.1.1.58	A
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Both)	Crack growth	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-22	3.1.1.21	I, 2

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.A2-14	3.1.1.83	B
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.A2-21	3.1.1.09	A
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of fracture toughness	Reactor Vessel Surveillance (B2.1.15)	IV.A2-24	3.1.1.18	C
RV Shell Head (Closure head dome, closure head flange)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.A2-25	3.1.1.63	B
RVI Baffle/Former Assembly (Baffle plates, former plates)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-1	3.1.1.33	A
RVI Baffle/Former Assembly (Baffle plates, former plates)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-2	3.1.1.30	B
RVI Baffle/Former Assembly (Baffle plates, former plates)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-3	3.1.1.22	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Baffle/Former Assembly (Baffle/former bolts)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-4	3.1.1.33	A
RVI Baffle/Former Assembly (Baffle/former bolts)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of preload	FSAR Commitment (B2.1.35)	IV.B2-5	3.1.1.27	A
RVI Baffle/Former Assembly (Baffle/former bolts)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-6	3.1.1.22	A
RVI Baffle/Former Assembly (Baffle/former bolts)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-10	3.1.1.30	B
RVI Baffle/Former Assembly (Baffle plates, former plates)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Control Rod Guide Tube Assembly (Control rod guide tube bolts, control rod guide tube support pins)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-27	3.1.1.33	A
RVI Control Rod Guide Tube Assembly (Control rod guide tube bolts, control rod guide tube support pins)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-28	3.1.1.37	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Control Rod Guide Tube Assembly (Control rod guide tubes)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-29	3.1.1.33	A
RVI Control Rod Guide Tube Assembly (Control rod guide tubes)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-30	3.1.1.30	B
RVI Control Rod Guide Tube Assembly (Control rod guide tube bolts, control rod guide tube support pins, control rod guide tubes)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Core Barrel Assembly (Core barrel, core barrel flange, core barrel outlet nozzles, neutron panel)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-7	3.1.1.33	A
RVI Core Barrel Assembly (Core barrel, core barrel flange, core barrel outlet nozzles, neutron panel)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-8	3.1.1.30	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Core Barrel Assembly (Core barrel, core barrel flange, core barrel outlet nozzles, neutron panel)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-9	3.1.1.22	A
RVI Core Barrel Assembly (Core barrel, core barrel flange, core barrel outlet nozzles, neutron panel)	DF, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Instrumentation Support Structures (Flux thimble tubes)	PB	Stainless Steel	Borated Water Leakage (Int)	None	None	IV.E-3	3.1.1.86	A
RVI Instrumentation Support Structures (Seal fittings, seal table)	PB, SS	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	C
RVI Instrumentation Support Structures (Flux thimble guide tubes, upper instrumentation columns)	PB, SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-11	3.1.1.33	A
RVI Instrumentation Support Structures (Flux thimble guide tubes, upper instrumentation columns)	PB, SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-12	3.1.1.30	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Instrumentation Support Structures (Flux thimble tubes)	PB	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Flux Thimble Tube Inspection (B2.1.21)	IV.B2-13	3.1.1.60	A
RVI Instrumentation Support Structures (Flux thimble guide tubes, upper instrumentation columns)	PB, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Instrumentation Support Structures (Seal fittings)	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	D
RVI Internals (TLAA)	DF, PB, SLD, SS	Stainless Steel	Reactor Coolant (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.B2-31	3.1.1.05	A
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Loss of preload	FSAR Commitment (B2.1.35)	IV.B2-14	3.1.1.27	A
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-15	3.1.1.33	A
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-16	3.1.1.37	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-17	3.1.1.22	A
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.B2-31	3.1.1.05	A
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloys	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Lower Internals Assembly (Clevis insert bolts, radial keys, clevis inserts)	SS	Nickel Alloy	Reactor Coolant (Ext)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.B2-34	3.1.1.63	D

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-15	3.1.1.33	A
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-16	3.1.1.37	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-17	3.1.1.22	A
RVI Lower Internals Assembly (Lower core plate)	DF, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-18	3.1.1.22	A
RVI Lower Internals Assembly (Lower core plate)	DF, SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-19	3.1.1.33	A
RVI Lower Internals Assembly (Lower core plate)	DF, SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-20	3.1.1.37	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of fracture toughness	FSAR Commitment (B2.1.35)	IV.B2-22	3.1.1.22	A
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-23	3.1.1.33	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-24	3.1.1.30	B
RVI Lower Internals Assembly (Fuel alignment pins, lower support forging, lower support columns, lower support column bolts, secondary core support, energy absorbers, lower tie plate, upper tie plate, manway cover, support ring)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of preload	FSAR Commitment (B2.1.35)	IV.B2-25	3.1.1.27	A
RVI Lower Internals Assembly (Lower core plate)	DF, SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Upper Internals Assembly (Head cooling spray nozzles)	DF	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Upper Internals Assembly (Upper support columns)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of preload	FSAR Commitment (B2.1.35)	IV.B2-33	3.1.1.27	A
RVI Upper Internals Assembly (Upper support columns)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.B2-34	3.1.1.63	B
RVI Upper Internals Assembly (Upper support columns)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-35	3.1.1.33	A
RVI Upper Internals Assembly (Head cooling spray nozzles)	DF	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-36	3.1.1.30	D
RVI Upper Internals Assembly (Upper support columns)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-36	3.1.1.30	B
RVI Upper Internals Assembly (Upper support column bolts)	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of preload	FSAR Commitment (B2.1.35)	IV.B2-38	3.1.1.27	A

Table 3.1.2-1 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Reactor Vessel and Internals (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
RVI Upper Internals Assembly (Upper support column bolts, upper core plate alignment pins, head/vessel alignment pins)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-39	3.1.1.33	A
RVI Upper Internals Assembly (Upper support column bolts, upper core plate alignment pins, head/vessel alignment pins)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-40	3.1.1.37	B
RVI Upper Internals Assembly (Upper support plate, upper core plate, holddown spring)	SS	Stainless Steel	Reactor Coolant (Ext)	Changes in dimensions	FSAR Commitment (B2.1.35)	IV.B2-41	3.1.1.33	A
RVI Upper Internals Assembly (Upper support plate, upper core plate, holddown spring)	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-42	3.1.1.30	B
RVI Upper Internals Assembly (Head cooling spray nozzles)	DF	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.B2-32	3.1.1.83	B
RVI Upper Internals Assembly (Head cooling spray nozzles)	DF	Stainless Steel	Reactor Coolant (Int)	Cracking	Water Chemistry (B2.1.2) and FSAR Commitment (B2.1.35)	IV.B2-36	3.1.1.30	D

Notes for Table 3.1.2-1:

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.
C	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.
I	Aging effect in NUREG-1801 for this component, material, and environment is not applicable.

Plant Specific Notes:

1	Note E was used to include the plant specific Nickel Alloy Aging Management Program (B2.1.34).
2	Analysis of underclad crack growth is not a TLAA for WCGS as defined in 10 CFR 54.3. See further evaluation 3.1.2.2.5.

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
Class 1 Piping <= 4in	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2) and One-Time Inspection Of ASME Code Class 1 Small-Bore Piping (B2.1.19)	IV.C2-1	3.1.1.70	B
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Closure Bolting	PB	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	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A

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
Closure Bolting	PB	Carbon 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	Nickel Alloys	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	F
Closure Bolting	PB	Nickel Alloys	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 6
Closure Bolting	PB	Stainless Steel	Borated Water Leakage (Ext)	Cracking	Bolting Integrity (B2.1.7)	IV.C2-7	3.1.1.52	B
Closure Bolting	PB	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.C2-8	3.1.1.52	B
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
Flow Element	PB	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
Flow Element	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Flow Element	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Flow Element	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Heat Exchanger Shell Side (HX # 1)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	IV.C2-14	3.1.1.53	D

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
Heat Exchanger Shell Side (HX # 1)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Heat Exchanger Tube Side (HX # 2, 5)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	IV.C2-14	3.1.1.53	D
Heat Exchanger Tube Side (HX # 2, 5)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Heat Exchanger Tube Side (HX # 3, 4, 6, 7, 8)	PB	Copper-Nickel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	IV.C2-11	3.1.1.54	D
Heat Exchanger Tube Side (HX # 3, 4, 6, 7)	PB	Copper-Nickel	Lubricating Oil (Ext)	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 Tube Side (HX # 8)	PB	Copper-Nickel	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	C
Heat Exchanger Tube Side (HX # 9)	PB	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	D

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
Heat Exchanger Tube Side (HX # 9)	PB	Stainless Steel	Reactor Coolant (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	D
Heat Exchanger Tube Side (HX # 9)	PB	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	D
Instrument Bellows	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Instrument Bellows	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	D
Instrument Bellows	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Instrument Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-22	3.1.1.68	D
Instrument Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	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	PB, SIA	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	IV.C2-14	3.1.1.53	B
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	A
Piping	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Piping	PB, SIA	Stainless Steel	Dry Gas (Int)	None	None	IV.E-5	3.1.1.86	A
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Piping	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	D
Piping	PB, SIA	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Piping	SIA	Stainless Steel	Reactor Coolant (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	IV.C2-17	3.1.1.36	D
Piping	PB, SIA	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A

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	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-26	3.1.1.62	B
Piping	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-27	3.1.1.68	B
Piping	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-22	3.1.1.68	D
Piping	SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Piping	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Piping	PB	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A

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	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cracking	Water Chemistry (B2.1.2) and ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-3	3.1.1.24	E, 3
Piping	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	None	None	IV.C2-4	3.1.1.57	I, 2
Piping	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Piping	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Piping	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-26	3.1.1.62	B
Pressurizer Relief Tank	SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	C
Pressurizer Relief Tank	SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Pressurizer Relief Tank	SIA	Stainless Steel	Treated Borated Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-23	3.1.1.07	I, 7
Pressurizer Relief Tank	SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	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
Pump	PB	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Pump	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-5	3.1.1.68	B
Pump	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Loss of fracture toughness	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-6	3.1.1.55	B
Pump	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Pump	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Pump	PB	Stainless Steel Cast Austenitic	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-26	3.1.1.62	B
PZR Components (TLAA)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A

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
PZR Components (TLAA)	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
PZR Heater Bundle Diaphragm Plate	SS	Stainless Steel	Reactor Coolant (Ext)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	D
PZR Heater Bundle Diaphragm Plate	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	B
PZR Heater Bundle Diaphragm Plate	SS	Stainless Steel	Reactor Coolant (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-20	3.1.1.68	B
PZR Heater Sheaths and Sleeves	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	C
PZR Heater Sheaths and Sleeves	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	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
PZR Heater Sheaths and Sleeves	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	B
PZR Heater Sheaths and Sleeves	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-20	3.1.1.68	B
PZR Instrument Penetrations	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
PZR Instrument Penetrations	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
PZR Instrument Penetrations	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	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
PZR Instrument Penetrations	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-19	3.1.1.64	B
PZR Integral Support	SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A
PZR Integral Support	SS	Carbon Steel	Borated Water Leakage (Ext)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-16	3.1.1.61	B
PZR Manways and Covers	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A
PZR Manways and Covers	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	D
PZR Manways and Covers	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	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
PZR Manways and Covers	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-19	3.1.1.64	B
PZR Nozzles	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A
PZR Nozzles	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
PZR Nozzles	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	B
PZR Nozzles	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-19	3.1.1.64	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
PZR Pressurizer Shell/Heads	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.C2-09	3.1.1.58	A
PZR Pressurizer Shell/Heads	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
PZR Pressurizer Shell/Heads	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	B
PZR Pressurizer Shell/Heads	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-19	3.1.1.64	B
PZR Safe Ends	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A
PZR Safe Ends	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	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
PZR Safe Ends	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.C2-24	3.1.1.31	E, 4
PZR Safe Ends	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
PZR Safe Ends	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
PZR Safe Ends	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
PZR Safe Ends	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-18	3.1.1.67	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
PZR Safe Ends	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-19	3.1.1.64	B
Rupture Disc	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Rupture Disc	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Rupture Disc	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Thermowell	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A
Thermowell	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.C2-13	3.1.1.31	E, 4
Thermowell	PB	Nickel Alloys	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	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
Thermowell	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Thermowell	PB	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
Thermowell	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Thermowell	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Thermowell	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Thermowell	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-26	3.1.1.62	B
Thermowell	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-27	3.1.1.68	B
Thermowell	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Thermowell	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Tubing	PB	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 3.1.2-2 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
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Tubing	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	B
Tubing	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Tubing	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-22	3.1.1.68	D
Tubing	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Valve	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	IV.C2-14	3.1.1.53	B
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Valve	PB, SIA	Stainless Steel	Dry Gas (Int)	None	None	IV.E-5	3.1.1.86	A

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
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	D
Valve	PB, SIA	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Valve	SIA	Stainless Steel	Reactor Coolant (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	IV.C2-17	3.1.1.36	D
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.C2-25	3.1.1.08	A
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1)	IV.C2-26	3.1.1.62	B
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-27	3.1.1.68	B
Valve	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	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
Valve	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-22	3.1.1.68	D
Valve	SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-31	3.2.1.48	B
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B

Notes for Table 3.1.2-2:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

I Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

Plant Specific Notes:

1 Not Used.

2 The WCGS RCS loops are constructed of CASS. The straight piping pieces are centrifugally cast and the fittings are statically cast. Based on a review of the WCGS Certified Material Test Reports, the Mo and ferrite values for these components are below the industry accepted thermal aging embrittlement significance threshold (<0.5% Mo, <20% ferrite). Therefore, thermal aging embrittlement of WCGS CASS RCS piping is not applicable.

3 Water Chemistry (B2.1.2) and ASME Section XI, Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) is used to manage this aging effect for Cast Austenitic Stainless Steel (CASS) components.

4 Note E was used to include the plant specific Nickel Alloy Aging Management Program (B2.1.34).

5 Not Used

6 Loss of preload is a potential aging effect for inconel bolts in the reactor coolant pumps. There is currently no NUREG-1801 line for nickel alloy closure bolting.

7 No vessel, tank, pump, or heat exchanger designs at WCGS are supported by TLAAs as defined in 10 CFR 54.3 except ASME Class 1 components and the Class 2 portions of the steam generators. The design of this WCGS component is therefore not supported by TLAAs.

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Closure Bolting (SG primary manway closure bolting)	PB	Carbon Steel	Borated Water Leakage (Ext)	Cracking	Bolting Integrity (B2.1.7)	IV.D1-2	3.1.1.52	B
SG Closure Bolting (SG primary manway closure bolting)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.D1-3	3.1.1.58	A
SG Closure Bolting (SG primary manway closure bolting)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.D1-10	3.1.1.52	B

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Closure Bolting (SG secondary manway closure bolting, SG secondary handhole closure bolting, SG secondary instrument hole cover closure bolting)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	IV.D1-10	3.1.1.52	B
SG Closure Bolting (SG secondary manway closure bolting, SG secondary handhole closure bolting, SG secondary instrument hole cover 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
SG Components (TLAA)	PB	Carbon Steel	Secondary Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.D1-11	3.1.1.07	A
SG Components (TLAA)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.D1-8	3.1.1.10	A

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Components (TLAA)	PB	Nickel Alloys	Reactor Coolant (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.D1-8	3.1.1.10	A
SG Feed ring (SG Feed ring)	DF	Carbon Steel	Secondary Water (Ext)	Wall thinning	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-26	3.1.1.32	E, 1
SG Feed ring (SG Feed ring)	DF	Carbon Steel	Secondary Water (Int)	Wall thinning	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-26	3.1.1.32	E, 1
SG Feed ring (Feedwater ring J-tubes)	DF	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D
SG Feed ring (Feedwater ring J-tubes)	DF	Nickel Alloys	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D
SG Feed ring (Feedwater ring J-tubes)	DF	Nickel Alloys	Secondary Water (Int)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D
SG Feed ring (Feedwater ring J-tubes)	DF	Nickel Alloys	Secondary Water (Int)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D
SG Flow Distribution Baffle (SG Flow Distribution Baffle)	DF	Stainless Steel	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D
SG Flow Distribution Baffle (SG Flow Distribution Baffle)	DF	Stainless Steel	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Internal Structures (SG wrapper)	DF	Carbon Steel	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-9	3.1.1.76	B
SG Internal Structures (Non-pressure boundary miscellaneous internal parts)	SS	Carbon Steel	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-9	3.1.1.76	D
SG Internal Structures (SG secondary blowdown apparatus)	DF	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D
SG Internal Structures (SG anti-vibration bars)	SS	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	B
SG Internal Structures (SG secondary blowdown apparatus)	DF	Nickel Alloys	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D
SG Internal Structures (SG anti-vibration bars)	SS	Nickel Alloys	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	B
SG Internal Structures (SG secondary blowdown apparatus)	DF	Nickel Alloys	Secondary Water (Int)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Internal Structures (SG secondary blowdown apparatus)	DF	Nickel Alloys	Secondary Water (Int)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D
SG Plugs (Mechanical SG tube plugs, SG welded tube plug)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-18	3.1.1.73	B
SG Plugs (Mechanical SG tube plugs, SG welded tube plug)	PB	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-22	3.1.1.72	D
SG Primary Head and Divider Plate (Channel head)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.D1-3	3.1.1.58	A
SG Primary Head and Divider Plate (Channel head)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-1	3.1.1.68	B

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Primary Head and Divider Plate (Tubesheet-primary face)	PB	Nickel Alloys	Reactor Coolant (Ext)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.D1-4	3.1.1.31	E, 2
SG Primary Head and Divider Plate (Primary channel divider plate)	DF	Nickel Alloys	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2)	IV.D1-6	3.1.1.81	B
SG Primary Head and Divider Plate (SG primary nozzle closure ring)	NSRS	Nickel Alloys	Reactor Coolant (Ext)	Cracking	Water Chemistry (B2.1.2)	IV.D1-6	3.1.1.81	D
SG Primary Man ways and Flanges (SG primary manway cover)	PB	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.D1-3	3.1.1.58	A
SG Primary Man ways and Flanges (Primary manway)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.D1-3	3.1.1.58	A

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Primary Man ways and Flanges (Primary manway)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-1	3.1.1.68	B
SG Primary Nozzles and Safe Ends (Primary coolant nozzle)	PB	Carbon Steel with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	IV.D1-3	3.1.1.58	A
SG Primary Nozzles and Safe Ends (Primary coolant nozzle)	PB	Carbon Steel with Stainless Steel Cladding	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-1	3.1.1.68	B
SG Primary Nozzles and Safe Ends (Primary coolant nozzle safe end weld, SG primary head drain)	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	IV.E-1	3.1.1.85	A, 4

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Primary Nozzles and Safe Ends (SG primary head drain)	PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Nickel Alloy Aging Management (B2.1.34), ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD (B2.1.1) for Class 1 components, Water Chemistry (B2.1.2), and Comply with applicable NRC Orders and FSAR Commitment (B2.1.35)	IV.D1-4	3.1.1.31	E, 2, 4
SG Secondary Man ways and Flanges (Secondary manway, SG secondary manway cover, SG secondary handhole, SG secondary handhole cover, SG secondary instrument hole cover)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Secondary Man ways and Flanges (Secondary manway, SG secondary manway cover, SG secondary handhole, SG secondary handhole cover, SG secondary instrument hole cover)	PB	Carbon Steel	Secondary Water (Int)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 2 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-12	3.1.1.16	B
SG Secondary Nozzles and Safe Ends (Bottom blowdown, secondary side shell drain, wide range water level tap, feedwater inlet nozzle, sampling tap, narrow range water level tap, wet layup tap, steam outlet nozzle and integral flow restrictor)	PB, TH (Note: Only steam outlet nozzle and integral flow restrictor has both intended functions)	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Secondary Nozzles and Safe Ends (Bottom blowdown, secondary side shell drain, wide range water level tap, feedwater inlet nozzle, sampling tap, narrow range water level tap, wet layup tap, steam outlet nozzle and integral flow restrictor)	PB, TH (Note: Only steam outlet nozzle and integral flow restrictor has both intended functions)	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	IV.D1-5	3.1.1.59	B
SG Secondary Nozzles and Safe Ends (Bottom blowdown, secondary side shell drain, wide range water level tap, feedwater inlet nozzle, sampling tap, narrow range water level tap, wet layup tap, steam outlet nozzle and integral flow restrictor)	PB, TH (Note: Only steam outlet nozzle and integral flow restrictor has both intended functions)	Carbon Steel	Secondary Water (Int)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 2 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-12	3.1.1.16	D

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Secondary Shell (Secondary shell)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
SG Secondary Shell (Tubesheet-secondary face)	PB	Carbon Steel	Secondary Water (Ext)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 2 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-12	3.1.1.16	B
SG Secondary Shell (Secondary shell)	PB	Carbon Steel	Secondary Water (Int)	Loss of material	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 2 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.D1-12	3.1.1.16	B
SG Tube Support Plates (Tube support plates)	SS	Stainless Steel	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-14	3.1.1.74	D
SG Tube Support Plates (Tube support plates)	SS	Stainless Steel	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-15	3.1.1.74	D
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Reactor Coolant (Int)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-20	3.1.1.73	B
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Secondary Water (Ext)	Denting	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-19	3.1.1.79	B

Table 3.1.2-3 Reactor Vessel, Internals, and Reactor Coolant System – Summary of Aging Management Evaluation – Steam Generators (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Secondary Water (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	IV.D1-21	3.1.1.06	I, 3
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-22	3.1.1.72	B
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Secondary Water (Ext)	Cracking	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-23	3.1.1.72	B
SG Tubes (SG Tubes)	HT, PB	Nickel Alloys	Secondary Water (Ext)	Loss of material	Steam Generator Tube Integrity (B2.1.8) and Water Chemistry (B2.1.2)	IV.D1-24	3.1.1.72	B
Tubing	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	IV.E-2	3.1.1.86	A
Tubing	LBS	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2)	VIII.B1-2	3.4.1.39	B
Tubing	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VIII.B1-3	3.4.1.37	B

Notes for Table 3.1.2-3:

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.

I Aging effect in NUREG-1801 for this component, material, and environment is not applicable

Plant Specific Notes:

1 Feedring wall thinning was described in NRC Information Notice 91-19, "Steam Generator Feedwater Distribution Piping Damage." This aging has been detected only in certain Combustion Engineering System 80 steam generators. The WCGS steam generators are Westinghouse Model F design. No plant specific operating experience at WCGS or other units with Model F steam generators suggests wall thinning of the Model F feedrings is occurring, therefore WCGS has determined this condition is not applicable to WCGS and no further evaluation is recommended.

2 Note E was used to include the plant specific Nickel Alloy Aging Management Program (B2.1.34).

3 Cumulative fatigue damage of steam generator tubes is not a TLAA as defined in 10 CFR 54.3. See section 4.3.2.5.

4 Steam generator primary coolant nozzle safe end weld has a recessed nickel alloy band on its exterior surface that is exposed to plant indoor air and is not exposed to reactor coolant environment.

Table 3.2.2-4 Engineered Safety Features – Summary of Aging Management Evaluation - Decontamination 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	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Piping	SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	C
Piping	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	A
Piping	PB, SIA	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	A
Piping	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B
Piping	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	A
Valve	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	A
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B
Valve	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A

Notes for Table 3.2.2-4:
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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

Plant Specific Notes:

None

Table 3.2.2-5 Engineered Safety Features – Summary of Aging Management Evaluation - Liquid Radwaste 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	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Closure Bolting	LBS, PB	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 1
Flow Element	PB	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
Flow Element	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	A
Flow Element	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Flow Element	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Flow Element	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B

Table 3.2.2-5 Engineered Safety Features – Summary of Aging Management Evaluation - Liquid Radwaste 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 Shell Side (HX # 10)	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 Shell Side (HX # 10)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	C
Heat Exchanger Tube Side (HX # 11, 12)	PB	Stainless Steel	Closed Cycle Cooling Water (Ext)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-7	3.2.1.28	D
Heat Exchanger Tube Side (HX # 13)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C
Heat Exchanger Tube Side (HX # 11, 12, 13)	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	D
Heat Exchanger Tube Side (HX # 11, 12, 13)	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	D
Heater	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-6	3.2.1.15	D
Heater	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	C
Instrument Bellows	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Instrument Bellows	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Instrument Bellows	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B

Table 3.2.2-5 Engineered Safety Features – Summary of Aging Management Evaluation - Liquid Radwaste 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	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	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	V.F-18	3.2.1.56	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	A
Piping	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	B
Piping	SIA	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Pump	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Pump	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Pump	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Spacer Ring	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Spacer Ring	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Spacer Ring	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Tank	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C

Table 3.2.2-5 Engineered Safety Features – Summary of Aging Management Evaluation - Liquid Radwaste System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tank	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Tank	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Thermowell	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-7	3.2.1.28	B
Thermowell	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Thermowell	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Thermowell	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Tubing	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-7	3.2.1.28	B
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Tubing	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Tubing	LBS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B
Valve	PB	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
Valve	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	V.F-18	3.2.1.56	A
Valve	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	A
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	B

Table 3.2.2-5 Engineered Safety Features – Summary of Aging Management Evaluation - Liquid Radwaste System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	SIA	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.A-27	3.2.1.49	B
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.A-28	3.2.1.48	B

Notes for Table 3.2.2-5:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

F Material not in NUREG-1801 for this component.

Plant Specific Notes:

1 NUREG 1801 does not consider stainless steel bolting in any environment. This non-NUREG-1801 line was added to account for the loss of preload / stress relaxation aging effect not addressed by other NUREG-1801 or non-NUREG-1801 lines. This non-NUREG-1801 line is based upon the same aging effects seen in carbon-steel bolting in NUREG-1801 line V.E-5.

Table 3.2.2-6 Engineered Safety Features – Summary of Aging Management Evaluation - Reactor Makeup 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	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-4	3.2.1.23	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Orifice	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Orifice	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Piping	LBS, PB, SIA	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Pump	LBS	Stainless Steel Cast Austenitic	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Pump	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Spacer Ring	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Spacer Ring	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Tubing	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Tubing	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A

Table 3.2.2-6 Engineered Safety Features – Summary of Aging Management Evaluation - Reactor Makeup 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
Valve	LBS, PB, SIA	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A

Notes for Table 3.2.2-6:

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.

Plant Specific Notes:

None

Table 3.2.2-7 Engineered Safety Features – Summary of Aging Management Evaluation - Containment Purge 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	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Closure Bolting	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	Bolting Integrity (B2.1.7)	V.E-1	3.2.1.23	B
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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F3-4	3.3.1.55	A
Damper	PB	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-8	3.2.1.31	A
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	V.F-17	3.2.1.55	C
Damper	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C

Table 3.2.2-7 Engineered Safety Features – Summary of Aging Management Evaluation - Containment Purge 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
Ductwork	DF	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-8	3.2.1.31	A
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Ductwork	DF, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	Hardening and loss of strength	External Surfaces Monitoring Program (B2.1.20)	VII.F3-7	3.3.1.11	E
Flex Connectors	PB	Elastomer	Ventilation Atmosphere (Int)	Hardening and loss of strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F3-7	3.3.1.11	A
Heat Exchanger Tube Side (HX # 14, 15, 16)	LBS	Copper	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F3-8	3.3.1.51	B
Heat Exchanger Tube Side (HX # 14, 15, 16)	LBS	Copper	Ventilation Atmosphere (Ext)	None	None	V.F-3	3.2.1.53	C
Piping	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-9	3.2.1.26	B

Table 3.2.2-7 Engineered Safety Features – Summary of Aging Management Evaluation - Containment Purge 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	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	A
Piping	PB, SIA	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F3-3	3.3.1.72	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-9	3.2.1.26	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.F3-18	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Tubing	LBS, PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A, 2
Valve	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-9	3.2.1.26	B
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
Valve	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F3-3	3.3.1.72	A

Table 3.2.2-7 Engineered Safety Features – Summary of Aging Management Evaluation - Containment Purge 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
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.C-9	3.2.1.26	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.F3-18	3.3.1.85	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
Valve	LBS	Copper Alloys	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F3-15	3.3.1.51	B
Valve	LBS	Copper Alloys	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Valve	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A, 2

Notes for Table 3.2.2-7:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

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. NUREG-1801 only addresses Loss of Preload for bolting of "Steel in Air-Indoor Uncontrolled."

2 Stainless steel valves and tubing in the containment purge system with an internal environment of ventilation atmosphere are not normally expected to be exposed to condensation. NUREG-1801 line referenced for the aging evaluation is V.F-12 which is for Air-Indoor Uncontrolled (external). In ventilation systems, the internal and external air environments are evaluated as equivalent.

Table 3.2.2-9 Engineered Safety Features – Summary of Aging Management Evaluation - Hydrogen Control 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	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
Orifice	PB	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Orifice	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	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	A
Piping	PB, SIA	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Piping	PB, SIA	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A
Recombiners	DF	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C
Recombiners	DF	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A
Sample Vessel	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C

Table 3.2.2-9 Engineered Safety Features – Summary of Aging Management Evaluation - Hydrogen 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
Sample Vessel	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A
Tubing	PB	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Tubing	PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Tubing	PB, SIA	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.C-1	3.2.1.31	A
Valve	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Valve	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	V.F-12	3.2.1.53	A

Notes for Table 3.2.2-9:
<u>Standard Notes:</u>

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

G Environment not in NUREG-1801 for this component and material.

Plant Specific Notes:

None

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection 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 with Stainless Steel Cladding	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	V.D1-1	3.2.1.45	A
Accumulator	PB	Carbon Steel with Stainless Steel Cladding	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Accumulator	PB	Carbon Steel with Stainless Steel Cladding	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	V.D1-33	3.2.1.48	B
Accumulator	PB	Nickel Alloys	Plant Indoor Air (Ext)	None	None	V.F-11	3.2.1.53	C
Accumulator	PB	Nickel Alloys	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	F, 2
Accumulator	PB	Nickel Alloys	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and Nickel Alloy Aging Management (B2.1.34)	None	None	F, 2

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Class 1 Piping <= 4in	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2) and One-Time Inspection Of ASME Code Class 1 Small-Bore Piping (B2.1.19)	IV.C2-1	3.1.1.70	B
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	V.E-5	3.2.1.24	B
Closure Bolting	LBS, PB	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 1
Filter	FIL	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-24	3.2.1.06	B
Filter	FIL	Stainless Steel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-24	3.2.1.06	B
Filter	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-28	3.2.1.16	B
Filter	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection System (Continued)

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	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Heat Exchanger Shell Side (HX # 17)	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-24	3.2.1.06	D
Heat Exchanger Shell Side (HX # 17)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C
Heat Exchanger Tube Side (HX # 18)	HT, PB	Copper-Nickel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-2	3.2.1.29	B
Heat Exchanger Tube Side (HX # 18)	HT, PB	Copper-Nickel	Closed Cycle Cooling Water (Int)	Reduction of heat transfer	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-2	3.3.1.52	B
Heat Exchanger Tube Side (HX # 18)	HT, PB	Copper-Nickel	Lubricating Oil (Ext)	Reduction of heat transfer	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-8	3.2.1.09	B
Heat Exchanger Tube Side (HX # 18)	HT, PB	Copper-Nickel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-18	3.2.1.06	D
Heat Exchanger Tube Side (HX # 19)	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-4	3.2.1.28	B

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection 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 Tube Side (HX # 19)	PB	Stainless Steel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-24	3.2.1.06	D
Heat Exchanger Tube Side (HX # 163)	LBS	Stainless Steel	Atmosphere/ Weather	None	None	None	None	G
Heat Exchanger Tube Side (HX # 163)	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	D
Heat Exchanger Tube Side (HX # 163)	LBS	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-5	3.4.1.14	D
Heat Exchanger Tube Side (HX # 20)	PB	Stainless Steel Cast Austenitic	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-4	3.2.1.28	B
Heat Exchanger Tube Side (HX # 20)	PB	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Instrument Bellows	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Instrument Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Orifice	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Orifice	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Piping	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	V.F-18	3.2.1.56	A

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection 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	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-28	3.2.1.16	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	A
Piping	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VIII.B1-8	3.4.1.37	B
Piping	LBS	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B
Piping	LBS	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	None	None	G
Piping	PB	Stainless Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	V.D1-26	3.2.1.04	E
Piping	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-22	3.2.1.28	B
Piping	PB	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Piping	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-2	3.1.1.68	B
Piping	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Piping	LBS	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2)	VIII.B1-2	3.4.1.39	B
Piping	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VIII.B1-3	3.4.1.37	B

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection 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	Stainless Steel	Treated Borated Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	V.D1-27	3.2.1.01	A
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Pump	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-28	3.2.1.16	B
Pump	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
Pump	PB	Copper-Nickel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-18	3.2.1.06	B
Pump	PB	Copper-Nickel	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Pump	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Pump	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Sight Gauge	PB	Copper Alloy (Brass Copper < 85%)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-18	3.2.1.06	B
Sight Gauge	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Sight Gauge	PB	Glass	Lubricating Oil (Int)	None	None	V.F-7	3.2.1.52	A
Sight Gauge	PB	Glass	Plant Indoor Air (Ext)	None	None	V.F-6	3.2.1.52	A

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Spacer Ring	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Spacer Ring	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Tank	PB	Carbon Steel (Galvanized or Coated)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-28	3.2.1.16	D
Tank	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	V.E-7	3.2.1.31	A
Tank	PB	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	None	None	G
Tank	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	C
Tank	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Thermowell	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-22	3.2.1.28	B
Thermowell	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Thermowell	LBS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Tubing	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B
Valve	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	V.F-18	3.2.1.56	A
Valve	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	A
Valve	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VIII.B1-8	3.4.1.37	B

Table 3.2.2-10 Engineered Safety Features – Summary of Aging Management Evaluation - High Pressure Coolant Injection System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	LBS	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B
Valve	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	V.D1-28	3.2.1.16	B
Valve	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	V.D1-22	3.2.1.28	B
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	V.F-15	3.2.1.56	A
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	V.F-12	3.2.1.53	A
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-5	3.1.1.68	B
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	V.D1-30	3.2.1.49	B

Notes for Table 3.2.2-10:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

Plant Specific Notes:
1 Loss of Preload requires aging management for stainless steel closure bolting in valves in the engineered safety features systems. Loss of Preload for stainless steel components in a borated water leakage environment is not evaluated in NUREG-1801.
2 NUREG-1801, Section V.D1 does not include any nickel alloy components. The HPCI system accumulator nozzles contain nickel alloy 82/182 weld metal. The plant-specific Nickel Alloy Aging Management Program (B2.1.34) manages cracking of nickel alloys. Water Chemistry program (B2.1.2) manages loss of material and cracking.

3.3.2.1.14 Fire Protection System

Materials

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

- Bronze
- Carbon Steel
- Carbon Steel (Galvanized or Coated)
- Cast Iron
- Cast Iron (Galvanized or Coated)
- Cast Iron (Gray Cast Iron)
- Copper
- Copper Alloy (Brass Copper < 85%)
- Ductile Iron
- Elastomer
- Glass
- Stainless Steel

Environment

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

- Atmosphere/ Weather
- Buried
- Diesel Exhaust
- Dry Gas
- Fuel Oil
- Lubricating Oil
- Plant Indoor Air
- Raw Water
- Wetted Gas

Aging Effects Requiring Management

The following fire protection system aging effects require management:

- Hardening and loss of strength
- Loss of material

Aging Effects Requiring Management

The following emergency diesel engine fuel oil storage and transfer 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 emergency diesel engine fuel oil storage and transfer system component types:

- Bolting Integrity (B2.1.7)
- Buried Piping and Tanks Inspection (B2.1.18)
- External Surfaces Monitoring Program (B2.1.20)
- Fuel Oil Chemistry (B2.1.14)
- One-Time Inspection (B2.1.16)

3.2.2.1.16 Emergency Diesel Engine System

Materials

The materials of construction for the emergency diesel engine system component types are:

- Carbon Steel
- Copper Alloy (Brass Copper < 85%)
- Elastomer
- Glass
- Insulation Ceramic Fibers
- Stainless Steel

Environment

The emergency diesel engine system component types are exposed to the following environments:

- Atmosphere/ Weather
- Closed Cycle Cooling Water
- Demineralized Water
- Diesel Exhaust
- Dry Gas
- Fuel Oil

- Lubricating Oil
- Plant Indoor Air
- Raw Water
- Ventilation Atmosphere
- Wetted Gas

Aging Effects Requiring Management

The following emergency diesel engine system aging effects require management:

- Cracking
- Hardening and loss of strength
- Loss of material
- Reduction of heat transfer

Aging Management Programs

The following aging management programs manage the aging effects for the emergency diesel engine system component types:

- Closed-Cycle Cooling Water System (B2.1.10)
- External Surfaces Monitoring Program (B2.1.20)
- Fuel Oil Chemistry (B2.1.14)
- • 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)

3.3.2.2.4.3 Stainless steel pump casings in the chemical and volume control system

The Water Chemistry program (B2.1.2) and the One-Time Inspection program (B2.1.16) will manage cracking due to stress corrosion cracking and cyclic loading for stainless steel pump casings exposed to treated borated water. The one-time inspection will include selected components at susceptible locations.

3.3.2.2.4.4 High strength bolting exposed to steam or water leakage

Not applicable. WCGS has no in-scope high-strength steel closure bolting exposed to air with steam or water leakage in the chemical and volume control system, so the applicable NUREG-1801 line was not used.

3.3.2.2.5 Hardening and Loss of Strength due to Elastomer Degradation

3.3.2.2.5.1 Elastomer seals of HVAC systems exposed to air-indoor (uncontrolled)

The External Surfaces Monitoring program (B2.1.20) will manage the hardening and loss of strength from elastomer degradation for elastomer external surfaces exposed to plant indoor air (uncontrolled) in locations where the ambient temperature cannot be shown to be less than 95F.

The Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) will manage the hardening and loss of strength from elastomer degradation for elastomer internal surfaces exposed to ventilation atmosphere in locations where the ambient temperature cannot be shown to be less than 95F.

The Fire Protection program (B2.1.12) will manage hardening and loss of strength from elastomer degradation for halon fire suppression system flexible hoses not periodically replaced in locations where the ambient temperature cannot be shown to be less than 95F.

In general, ambient temperature in HVAC equipment spaces is expected to be below 95 degrees. Below 95 degrees, thermal aging of elastomers is not considered significant.

3.3.2.2.5.2 Elastomer linings in spent fuel pool cooling and cleanup systems

Not applicable. WCGS has no in-scope elastomer lined components exposed to treated or treated borated water in the fuel pool cooling and cleanup system, so the applicable NUREG-1801 lines were not used.

3.3.2.2.6 Reduction of Neutron-Absorbing Capacity and Loss of Material due to General Corrosion

The original boraflex spent fuel pool racks were replaced in 1999 with boral spent fuel pool racks. The WCGS Technical Specifications, Section 4.3 require that the spent fuel storage racks be maintained for reactivity (k-effective) at or below 0.95 if fully flooded with unborated water, which includes an allowance for uncertainties as described in Section 9.1A of the USAR. The new racks are designed, fabricated and installed to ensure operation for an intended period of 60 years. This modification was incorporated in Amendment No. 120 to the Operating License.

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
3.3.1.01	Steel cranes - structural girders exposed to air – indoor uncontrolled (external)	Cumulative fatigue damage	TLAA to be evaluated for structural girders of cranes. See the Standard Review Plan, Section 4.7 for generic guidance for meeting the requirements of 10 CFR 54.21(c)(1).	Yes, TLAA	Fatigue of metal components is a TLAA. See further evaluation in subsection 3.3.2.2.1.
3.3.1.02	Steel and stainless steel piping, piping components, piping elements, and heat exchanger components exposed to air – indoor uncontrolled, treated borated water or treated water	Cumulative fatigue damage	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Fatigue of Class 1 components is a TLAA. No vessel, tank, pump, or heat exchanger designs at WCGS are supported by TLAAs except ASME Section III Class 1 components and the Class 2 portions of the steam generators. The CVCS system contains no in-scope carbon steel piping. See further evaluation in subsection 3.3.2.2.1.
3.3.1.03					Not applicable - BWR only
3.3.1.04					Not applicable - BWR only

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.05					Not applicable - BWR only
3.3.1.06	Stainless steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Cracking due to stress corrosion cracking	A plant specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). See further evaluation in subsection 3.3.2.2.3.3.
3.3.1.07	Stainless steel non-regenerative heat exchanger components exposed to treated borated water >60°C (>140°F)	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry (B2.1.2) and a plant-specific verification program. An acceptable verification program is to include temperature and radioactivity monitoring of the shell side water, and eddy current testing of tubes.	Yes	Not applicable. The letdown, excess letdown, and seal water heat exchangers are exposed to treated borated water greater than 140F (tube-side) and component cooling water (shell-side). The shell side is managed by the Closed-Cycle Cooling Water System program using item 3.3.1.46. The tube-side is managed by the Water Chemistry and One-Time Inspection Programs using item number 3.3.1.08. The Closed-Cycle Cooling Water System program (B2.1.10) includes eddy current testing for the heat exchanger shell-side components exposed to component cooling water. Radiation monitors are installed in each train of the component cooling water system and alarm when abnormal radioactivity levels are detected. Heat exchanger outlet temperatures of the heat exchangers are not typically monitored, this was noted as a program exception to the Closed-Cycle Cooling Water System program.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.08	Stainless steel regenerative heat exchanger components exposed to treated borated water >60°C (>140°F)	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry (B2.1.2) and a plant specific verification program. The AMP is to be augmented by verifying the absence of cracking due to stress corrosion cracking and cyclic loading. A plant specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16). See further evaluation in subsection 3.3.2.2.4.2.
3.3.1.09	Stainless steel high-pressure pump casing in PWR chemical and volume control system	Cracking due to stress corrosion cracking and cyclic loading	Water Chemistry (B2.1.2) and a plant specific verification program. The AMP is to be augmented by verifying the absence of cracking due to stress corrosion cracking and cyclic loading. A plant specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16). See further evaluation in subsection 3.3.2.2.4.3.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.10	High-strength steel closure bolting exposed to air with steam or water leakage.	Cracking due to stress corrosion cracking, cyclic loading	Bolting Integrity (B2.1.7) The AMP is to be augmented by appropriate inspection to detect cracking if the bolts are not otherwise replaced during maintenance.	Yes	Not applicable. WCGS has no in-scope high-strength steel closure bolting exposed to air with steam or water leakage in the chemical and volume control system, so the applicable NUREG-1801 line was not used.
3.3.1.11	Elastomer seals and components exposed to air – indoor uncontrolled (internal/external)	Hardening and loss of strength due to elastomer degradation	A plant specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management programs used to manage aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22), Fire Protection program (B2.1.12), and External Surfaces Monitoring (B2.1.20). See further evaluation in subsection 3.3.2.2.5.1.
3.3.1.12	Elastomer lining exposed to treated water or treated borated water	Hardening and loss of strength due to elastomer degradation	A plant-specific aging management program is to be evaluated.	Yes	Not applicable. WCGS has no in-scope elastomer lined components exposed to treated or treated borated water in the fuel pool cooling and cleanup system, so the applicable NUREG-1801 lines were not used.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.13	Boral, boron steel spent fuel storage racks neutron-absorbing sheets exposed to treated water or treated borated water	Reduction of neutron-absorbing capacity and loss of material due to general corrosion	A plant specific aging management program is to be evaluated.	Yes	Exception to NUREG-1801. Aging effect in NUREG-1801 for this material and environment combination is not applicable. Aluminum, which is the host material in boral, is a reactive material but develops a strongly bonded oxide film which gives it excellent corrosion resistance in most environments. There is no net loss of aluminum cladding during the passivation process in which aluminum forms a hydrated aluminum oxide film. Additionally, aluminum alloys exhibit negligible corrosive action in boric acid solutions. Industry operating experience also shows no degradation of neutron absorbing capacity for boral exposed to spent fuel pool environments. As a result no AMP is needed to manage loss of material or reduction of neutron absorbing capacity for boral in treated borated water. See further evaluation in subsection 3.3.2.2.6.
3.3.1.14	Steel piping, piping component, and piping elements exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Lubricating Oil Analysis (B2.1.23). See further evaluation in subsection 3.3.2.2.7.1.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.15	Steel reactor coolant pump oil collection system piping, tubing, and valve bodies exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with a different aging management program. The component environment is potentially contaminated lubricating oil that is not managed by Lubricating Oil Analysis (B2.1.23), to maintain lubricating oil quality. Loss of material on internal component surfaces exposed to contaminated lubricating oil environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22), in lieu of Lubricating Oil Analysis (B2.1.23). See further evaluation in subsection 3.3.2.2.7.1.
3.3.1.16	Steel reactor coolant pump oil collection system tank exposed to lubricating oil	Loss of material due to general, pitting, and crevice corrosion	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16) to evaluate the thickness of the lower portion of the tank	Yes	Not applicable. The WCGS reactor coolant pump oil collection system tank is constructed of stainless steel vice steel, so the applicable NUREG-1801 line was not used.
3.3.1.17					Not applicable - BWR only
3.3.1.18	Stainless steel and steel diesel engine exhaust piping, piping components, and piping elements exposed to diesel exhaust	Loss of material/ general (steel only), pitting and crevice corrosion	A plant specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). See further evaluation in subsection 3.3.2.2.7.3.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.19	Steel (with or without coating or wrapping) piping, piping components, and piping elements exposed to soil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion	Buried Piping and Tanks Inspection (B2.1.18)	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.3.2.2.8.
3.3.1.20	Steel piping, piping components, piping elements, and tanks exposed to fuel oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fuel Oil Chemistry (B2.1.14). See further evaluation in subsection 3.3.2.2.9.1.
3.3.1.21	Steel heat exchanger components exposed to lubricating oil	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Lubricating Oil Analysis (B2.1.23). See further evaluation in subsection 3.3.2.2.9.2.
3.3.1.22	Steel with elastomer lining or stainless steel cladding piping, piping components, and piping elements exposed to treated water and treated borated water	Loss of material due to pitting and crevice corrosion (only for steel after lining/cladding degradation)	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	Yes	Not applicable. WCGS has no in-scope components constructed of steel with elastomer lining or steel with stainless steel cladding exposed to treated or treated borated water in the fuel pool cooling and cleanup system, so the applicable NUREG-1801 lines were not used.
3.3.1.23					Not applicable - BWR only
3.3.1.24					Not applicable - BWR only

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

Item Number	Component Type	Aging Effect/ Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.25	Copper alloy HVAC piping, piping components, piping elements exposed to condensation (external)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management programs used to manage aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22) and External Surfaces Monitoring (B2.1.20). See further evaluation in subsection 3.3.2.2.10.3.
3.3.1.26	Copper alloy piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting and crevice corrosion	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Lubricating Oil Analysis (B2.1.23). See further evaluation in subsection 3.3.2.2.10.4.
3.3.1.27	Stainless steel HVAC ducting and aluminum HVAC piping, piping components and piping elements exposed to condensation	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). See further evaluation in subsection 3.3.2.2.10.5.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.28	Copper alloy fire protection piping, piping components, and piping elements exposed to condensation (internal)	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). See further evaluation in subsection 3.3.2.2.10.6.
3.3.1.29	Stainless steel piping, piping components, and piping elements exposed to soil	Loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated.	Yes	Not applicable. WCGS has no in-scope stainless steel components exposed to soil in the open-cycle cooling water, ultimate heat sink, fire protection, diesel fuel oil, or emergency diesel generator systems, so the applicable NUREG-1801 lines were not used.
3.3.1.30					Not applicable - BWR only
3.3.1.31					Not applicable - BWR only
3.3.1.32	Stainless steel, aluminum and copper alloy piping, piping components, and piping elements exposed to fuel oil	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fuel Oil Chemistry (B2.1.14). See further evaluation in subsection 3.3.2.2.12.1.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.33	Stainless steel piping, piping components, and piping elements exposed to lubricating oil	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	Yes	Consistent with NUREG-1801 with aging management program exceptions for components associated with the Centrifugal Charging Pump and Standby Diesel Engine lubricating oil systems. The aging management program(s) with exceptions to NUREG-1801 include: Lubricating Oil Analysis (B2.1.23). See further evaluation in subsection 3.3.2.2.12.2. Consistent with NUREG-1801 except a different aging management program is credited for components associated with the reactor coolant pump lube oil collection system. The component environment is potentially contaminated lubricating oil that is not within the scope of Lubricating Oil Analysis (B2.1.23), to maintain lube oil quality. Loss of material on internal component surfaces exposed to contaminated oil environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). See further evaluation in subsection 3.3.2.2.7.1.
3.3.1.34	Elastomer seals and components exposed to air – indoor uncontrolled (internal or external)	Loss of material due to Wear	A plant specific aging management program is to be evaluated.	Yes	Not applicable. WCGS has no in-scope elastomer components exposed to air - indoor uncontrolled (internal or external) with relative motion with other components to produce an aging effect of loss of material due to wear. Therefore, the applicable NUREG-1801 lines were not used.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.35	Steel with stainless steel cladding pump casing exposed to treated borated water	Loss of material due to cladding breach	A plant-specific aging management program is to be evaluated. Reference NRC Information Notice 94-63, "Boric Acid Corrosion of Charging Pump Casings Caused by Cladding Cracks."	Yes	Not applicable. WCGS has no in-scope pumps in the chemical and volume control system that are steel with stainless steel cladding exposed to treated borated water, so the NUREG-1801 line was not used.
3.3.1.36					Not applicable - BWR only
3.3.1.37					Not applicable - BWR only
3.3.1.38					Not applicable - BWR only
3.3.1.39					Not applicable - BWR only
3.3.1.40	Steel tanks in diesel fuel oil system exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	Aboveground Steel Tanks	No	Not applicable. WCGS has no in-scope steel tanks in the emergency diesel engine fuel oil storage and transfer system exposed to air - outdoor (external), so the applicable NUREG-1801 line was not used.
3.3.1.41	High-strength steel closure bolting exposed to air with steam or water leakage	Cracking due to cyclic loading, stress corrosion cracking	Bolting Integrity (B2.1.7)	No	Not applicable. WCGS has no in-scope high-strength steel closure bolting in the auxiliary systems, so the applicable NUREG-1801 line was not used.
3.3.1.42	Steel closure bolting exposed to air with steam or water leakage	Loss of material due to general corrosion	Bolting Integrity (B2.1.7)	No	Not applicable. WCGS has no in-scope steel closure bolting exposed to air with steam or water leakage in the auxiliary systems, so the applicable NUREG-1801 line was not used.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.43	Steel bolting and closure bolting exposed to air – indoor uncontrolled (external) or air – outdoor (External)	Loss of material due to general, pitting, and crevice corrosion	Bolting Integrity (B2.1.7)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Bolting Integrity (B2.1.7).
3.3.1.44	Steel compressed air system closure bolting exposed to condensation	Loss of material due to general, pitting, and crevice corrosion	Bolting Integrity (B2.1.7)	No	Not applicable. WCGS has no in-scope steel closure bolting exposed to condensation in the compressed air system, so the applicable NUREG-1801 line was not used.
3.3.1.45	Steel closure bolting exposed to air – indoor uncontrolled (external)	Loss of preload due to thermal effects, gasket creep, and self-loosening	Bolting Integrity (B2.1.7)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Bolting Integrity (B2.1.7).
3.3.1.46	Stainless steel and stainless clad steel piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water >60°C (>140°F)	Cracking due to stress corrosion cracking	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).
3.3.1.47	Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, and crevice corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.48	Steel piping, piping components, piping elements, tanks, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to general, pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).
3.3.1.49					Not applicable - BWR only
3.3.1.50	Stainless steel piping, piping components, and piping elements exposed to closed cycle cooling water	Loss of material due to pitting and crevice corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).
3.3.1.51	Copper alloy piping, piping components, piping elements, and heat exchanger components exposed to closed cycle cooling water	Loss of material due to pitting, crevice, and galvanic corrosion	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).
3.3.1.52	Steel, stainless steel, and copper alloy heat exchanger tubes exposed to closed cycle cooling water	Reduction of heat transfer due to fouling	Closed-Cycle Cooling Water System (B2.1.10)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Closed-Cycle Cooling Water System (B2.1.10).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.53	Steel compressed air system piping, piping components, and piping elements exposed to condensation (internal)	Loss of material due to general and pitting corrosion	Compressed Air Monitoring	No	Consistent with NUREG-1801 with a different aging management program. NUREG-1801, Section XI.M24, "Compressed Air Monitoring" applies to monitoring the piping and components associated with the air compressors and dryers. Air compressor and dryer piping and components are not in-scope for WCGS. In-scope piping and components are associated with containment penetrations and nitrogen gas piping and components used as a backup source for closure of valves. Therefore, Inspections of Internal Surfaces In Miscellaneous Piping and Ducting Components (B2.1.22), and/or 10 CFR Part 50 Appendix J (B2.1.30), is credited, as appropriate, to manage aging effects for the in-scope piping and components.
3.3.1.54	Stainless steel compressed air system piping, piping components, and piping elements exposed to internal condensation	Loss of material due to pitting and crevice corrosion	Compressed Air Monitoring	No	Not applicable. WCGS has no in-scope stainless steel components exposed to internal condensation in the compressed air system, so the applicable NUREG-1801 line was not used.
3.3.1.55	Steel ducting closure bolting exposed to air – indoor uncontrolled (external)	Loss of material due to general corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801.
3.3.1.56	Steel HVAC ducting and components external surfaces exposed to air – indoor uncontrolled (external)	Loss of material due to general corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.57	Steel piping and components external surfaces exposed to air – indoor uncontrolled (External)	Loss of material due to general corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801.
3.3.1.58	Steel external surfaces exposed to air – indoor uncontrolled (external), air - outdoor (external), and condensation (external)	Loss of material due to general corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801 for all components except different AMP credited for containment equipment hatch and radiation missile shield hand trolleys. Inspection of Overhead Heavy and Light Load (Related to Refueling) Handling Systems (B2.1.11) is credited to manage aging as the containment equipment hatch and radiation missile shield hand trolleys are evaluated as crane components.
3.3.1.59	Steel heat exchanger components exposed to air – indoor uncontrolled (external) or air -outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801.
3.3.1.60	Steel piping, piping components, and piping elements exposed to air - outdoor (external)	Loss of material due to general, pitting, and crevice corrosion	External Surfaces Monitoring (B2.1.20)	No	Consistent with NUREG-1801.
3.3.1.61	Elastomer fire barrier penetration seals exposed to air – outdoor or air - indoor uncontrolled	Increased hardness, shrinkage and loss of strength due to weathering	Fire Protection (B2.1.12)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.62	Aluminum piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting and crevice corrosion	Fire Protection (B2.1.12)	No	Not applicable. WCGS has no in-scope aluminum components exposed to raw water in the fire protection system, so the applicable NUREG-1801 line was not used.
3.3.1.63	Steel fire rated doors exposed to air – outdoor or air - indoor uncontrolled	Loss of material due to Wear	Fire Protection (B2.1.12)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12).
3.3.1.64	Steel piping, piping components, and piping elements exposed to fuel oil	Loss of material due to general, pitting, and crevice corrosion	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12), Fuel Oil Chemistry (B2.1.14).
3.3.1.65	Reinforced concrete structural fire barriers – walls, ceilings and floors exposed to air – indoor uncontrolled	Concrete cracking and spalling due to aggressive chemical attack, and reaction with aggregates	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12).
3.3.1.66	Reinforced concrete structural fire barriers – walls, ceilings and floors exposed to air – outdoor	Concrete cracking and spalling due to freeze thaw, aggressive chemical attack, and reaction with aggregates	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.67	Reinforced concrete structural fire barriers – walls, ceilings and floors exposed to air – outdoor or air - indoor uncontrolled	Loss of material due to corrosion of embedded steel	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Fire Protection (B2.1.12).
3.3.1.68	Steel piping, piping components, and piping elements exposed to raw water	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, and fouling	Fire Water System (B2.1.13)	No	Consistent with NUREG-1801 for steel piping, piping components, and piping elements exposed to raw water on the external surfaces. Consistent with NUREG-1801 except different aging management program is credited for steel piping, piping components, and piping elements exposed to raw water on the internal surfaces. Fire Water System (B2.1.13), will be credited in conjunction with Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22), to manage the aging effects.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.69	Stainless steel piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting and crevice corrosion, and fouling	Fire Water System (B2.1.13)	No	Consistent with NUREG-1801 with different aging management program and aging management program exceptions for components associated with the Fire Protection System. The aging management programs credited to manage aging of stainless steel piping, piping components, and piping elements exposed to raw water (internal) in the Fire Protection System include: Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22). The aging management program(s) with exceptions to NUREG-1801 include: Fire Water System (B2.1.13). Consistent with NUREG-1801 except a different aging management program is credited for components associated with the floor and equipment drain system. The component environment is potentially contaminated sump (raw) water that is not within the scope of Fire Water System (B2.1.13), to manage the aging effects. Loss of material on internal component surfaces exposed to contaminated sump (raw) water will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.70	Copper alloy piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting, crevice, and microbiologically influenced corrosion, and fouling	Fire Water System (B2.1.13)	No	Consistent with NUREG-1801 with aging management program exceptions for the copper alloy sprinkler heads exposed to raw water (internal) in the Fire Protection System. The aging management program(s) with exceptions to NUREG-1801 include: Fire Water System (B2.1.13). Consistent with NUREG-1801 with different aging management program for all other copper alloy components exposed to raw water (internal) in the Fire Protection System. The aging management programs credited to manage aging of copper alloy piping, piping components, and piping elements exposed to raw water (internal) in the Fire Protection System include: Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22).
3.3.1.71	Steel piping, piping components, and piping elements exposed to moist air or condensation (Internal)	Loss of material due to general, pitting, and crevice corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	No	Consistent with NUREG-1801.
3.3.1.72	Steel HVAC ducting and components internal surfaces exposed to condensation (Internal)	Loss of material due to general, pitting, crevice, and (for drip pans and drain lines) microbiologically influenced corrosion	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	No	Consistent with NUREG-1801.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.73	Steel crane structural girders in load handling system exposed to air-indoor uncontrolled (external)	Loss of material due to general corrosion	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.11)	No	Consistent with NUREG-1801.
3.3.1.74	Steel cranes - rails exposed to air – indoor uncontrolled (external)	Loss of material due to Wear	Inspection of Overhead Heavy Load and Light Load (Related to Refueling) Handling Systems (B2.1.11)	No	Consistent with NUREG-1801.
3.3.1.75	Elastomer seals and components exposed to raw water	Hardening and loss of strength due to elastomer degradation; loss of material due to erosion	Open-Cycle Cooling Water System (B2.1.9)	No	Not applicable. WCGS has no in-scope elastomer components exposed to raw water in the open-cycle cooling water systems, so the applicable NUREG-1801 lines were not used.
3.3.1.76	Steel piping, piping components, and piping elements (without lining/coating or with degraded lining/coating) exposed to raw water	Loss of material due to general, pitting, crevice, and microbiologically influenced corrosion, fouling, and lining/coating degradation	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801 for all components except different aging management program is credited for piping and valves in the secondary liquid waste and oily waste systems. The environment for these components is potentially contaminated raw water that is not within the scope of Open Cycle Cooling Water System (B2.1.9), to manage aging. Loss of material on internal component surfaces exposed to contaminated raw water environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.77	Steel heat exchanger components exposed to raw water	Loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801.
3.3.1.78	Stainless steel, nickel alloy, and copper alloy piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting and crevice corrosion	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801.
3.3.1.79	Stainless steel piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting and crevice corrosion, and fouling	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801 for all components except a different aging management program is credited for piping and piping components in the secondary liquid waste, yard drainage, chemical and detergent waste, and oily waste systems. The component environment is potentially contaminated raw water that is not within the scope of Open Cycle Cooling Water (B2.1.9), to manage aging. Loss of material on internal component surfaces exposed to contaminated raw water environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22).
3.3.1.80	Stainless steel and copper alloy piping, piping components, and piping elements exposed to raw water	Loss of material due to pitting, crevice, and microbiologically influenced corrosion	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.81	Copper alloy piping, piping components, and piping elements, exposed to raw water	Loss of material due to pitting, crevice, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System (B2.1.9)	No	Not applicable. WCGS has no in-scope copper alloy piping, piping components or piping elements exposed to raw water in the open-cycle cooling water systems, so the applicable NUREG-1801 lines were not used.
3.3.1.82	Copper alloy heat exchanger components exposed to raw water	Loss of material due to pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801.
3.3.1.83	Stainless steel and copper alloy heat exchanger tubes exposed to raw water	Reduction of heat transfer due to fouling	Open-Cycle Cooling Water System (B2.1.9)	No	Consistent with NUREG-1801.
3.3.1.84	Copper alloy >15% Zn piping, piping components, piping elements, and heat exchanger components exposed to raw water, treated water, or closed cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials (B2.1.17)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Selective Leaching of Materials (B2.1.17).
3.3.1.85	Gray cast iron piping, piping components, and piping elements exposed to soil, raw water, treated water, or closed-cycle cooling water	Loss of material due to selective leaching	Selective Leaching of Materials (B2.1.17)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Selective Leaching of Materials (B2.1.17).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.86	Structural steel (new fuel storage rack assembly) exposed to air – indoor uncontrolled (external)	Loss of material due to general, pitting, and crevice corrosion	Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801.
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. WCGS has no boraflex spent fuel storage racks exposed to treated borated water in the fuel pool cooling and cleanup system, so the applicable NUREG-1801 line was not used.
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. WCGS has no in-scope aluminum or copper alloy > 15% 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.
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	Not applicable. WCGS has no in-scope steel bolting and external surfaces exposed to air with borated water leakage in the auxiliary systems, so the applicable NUREG-1801 lines were not used.
3.3.1.90	Stainless steel and steel with stainless steel cladding piping, piping components, piping elements, tanks, and fuel storage racks exposed to treated borated water >60°C (>140°F)	Cracking due to stress corrosion cracking	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2).

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.91	Stainless steel and steel with stainless steel cladding piping, piping components, and piping elements exposed to treated borated water	Loss of material due to pitting and crevice corrosion	Water Chemistry (B2.1.2)	No	Consistent with NUREG-1801 for all components except a different aging management program is credited for components in the floor and equipment drains system. The component environment is potentially contaminated raw water that is not within the scope of Open Cycle Cooling Water (B2.1.9), to manage aging. Loss of material on internal component surfaces exposed to contaminated raw water environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22).
3.3.1.92	Galvanized steel piping, piping components, and piping elements exposed to air – indoor uncontrolled	None	None	NA	Consistent with NUREG-1801.
3.3.1.93	Glass piping elements exposed to air, air – indoor uncontrolled (external), fuel oil, lubricating oil, raw water, treated water, and treated borated water	None	None	NA	Consistent with NUREG-1801.
3.3.1.94	Stainless steel and nickel alloy piping, piping components, and piping elements exposed to air – indoor uncontrolled (external)	None	None	NA	Consistent with NUREG-1801.

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

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.3.1.95	Steel and aluminum piping, piping components, and piping elements exposed to air – indoor controlled (external)	None	None	NA	Consistent with NUREG-1801.
3.3.1.96	Steel and stainless steel piping, piping components, and piping elements in concrete	None	None	NA	Consistent with NUREG-1801.
3.3.1.97	Steel, stainless steel, aluminum, and copper alloy piping, piping components, and piping elements exposed to gas	None	None	NA	Consistent with NUREG-1801.
3.3.1.98	Steel, stainless steel, and copper alloy piping, piping components, and piping elements exposed to dried air	None	None	NA	Consistent with NUREG-1801.
3.3.1.99	Stainless steel and copper alloy <15% Zn piping, piping components, and piping elements exposed to air with borated water leakage	None	None	NA	Consistent with NUREG-1801.

Table 3.3.2-1 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Handling—Fuel Storage and Handling System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Fuel Handling Equip	PB	Stainless Steel	Borated Water Leakage (Int)	None	None	VII.J-16	3.3.1.99	C
Fuel Handling Equip	NSRS, PB, SS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Neutron Absorbers (Boral)	AN	Boral	Treated Borated Water (Ext)	None	None	VII.A2-5	3.3.1.13	I, 1
New Fuel Racks	SS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	VII.A1-1	3.3.1.86	A
New Fuel Racks	SS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Spent Fuel Racks	SS	Stainless Steel	Treated Borated Water (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	None	None	H, 2
Spent Fuel Racks	SS	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.A2-1	3.3.1.91	D
Spent Fuel Racks	SS	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2)	VII.A2-7	3.3.1.90	B

Notes for Table 3.3.2-1:

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.
C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.
H Aging effect not in NUREG-1801 for this component, material, and environment combination.

I Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

Plant Specific Notes:

1 The boraflex spent fuel pool racks at WCGS were replaced in 1999 with boral. WCGS Specifications require that the new racks be designed, fabricated and installed to ensure operation for a period of 60 years. This specification was written based upon the criterion of NUREG-0800 which requires that reactivity (k-effective) be maintained equivalent to or less than 0.95. Additionally the WCGS Technical Specifications require that the spent fuel storage racks be maintained for reactivity (k-effective) at or below 0.95 if fully flooded with unborated water, which includes an allowance for uncertainties. The NRC approved this modification in Amendment No. 120 to the WCGS Operating License. As a result no aging management program is necessary to monitor or survey the neutron absorbing capacity of the boral. Aluminum, which is the host material in boral, is a reactive material but develops a strongly bonded oxide film which gives it excellent corrosion resistance in most environments. Additionally, aluminum alloys exhibit negligible action in boric acid solutions. As a result no aging management program is needed for aluminum as there are no aging effects requiring management.

2 Fatigue design of the spent fuel racks for seismic events is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c)(1). Section 4.3.6 describes the evaluation of this TLAA for the fatigue design of the spent fuel racks.

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation - 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
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	LBS, PB	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 2
Closure Bolting	PB	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Closure Bolting	PB	Stainless Steel	Treated Borated Water (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F
Closure Bolting	PB	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Flow Element	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Pool Cooling and Cleanup 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 Shell Side (HX # 26)	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
Heat Exchanger Shell Side (HX # 26)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Heat Exchanger Tube Side (HX # 28)	HT, PB	Stainless Steel	Closed Cycle Cooling Water (Ext)	Reduction of heat transfer	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-3	3.3.1.52	B
Heat Exchanger Tube Side (HX # 27, 28)	HT, PB	Stainless Steel	Closed Cycle Cooling Water (Ext)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-10	3.3.1.50	D
Heat Exchanger Tube Side (HX # 29)	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Heat Exchanger Tube Side (HX # 27, 28, 29)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Heat Exchanger Tube Side (HX # 27, 28, 29)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Reduction of heat transfer	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	F

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Pool Cooling and Cleanup 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 Tube Side (HX # 27, 28, 29)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	D
Expansion Joint Bellows	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Expansion Joint Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Expansion Joint Bellows	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Penetrations Mechanical	PB	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Penetrations Mechanical	PB	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Penetrations Mechanical	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Penetrations Mechanical	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Piping	PB, SIA	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	D
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	A
Piping	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	PB, SIA	Stainless Steel	Encased in Concrete (Ext)	None	None	VII.J-17	3.3.1.96	A
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A

Table 3.3.2-2 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Pool Cooling and Cleanup 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	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Piping	PB, SIA	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Pump	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Pump	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Pump	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Pump	LBS	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Spacer Ring	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Spacer Ring	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Spacer Ring	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Strainer	NSRS	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Strainer	NSRS	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Strainer	NSRS	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Strainer	NSRS	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Thermowell	PB	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
Thermowell	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Thermowell	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Thermowell	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Tubing	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B
Valve	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	D
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	None	None	H, 1
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.A3-8	3.3.1.91	B

Notes for Table 3.3.2-2:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

F Material not in NUREG-1801 for this component.

H Aging effect not in NUREG-1801 for this component, material and environment combination.

Plant Specific Notes:

1 This non-NUREG-1801 line is based upon the NUREG-1801 line VII.A2-7, which considers stainless steel components in treated borated water environment over 140 degrees F.

2 NUREG 1801 does not consider stainless steel bolting in any environment. This non-NUREG-1801 line was added to account for the loss of preload / stress relaxation aging effect not addressed by other NUREG-1801 or non-NUREG-1801 lines.

Table 3.3.2-6 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	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C
Accumulator	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.D-3	3.3.1.57	A
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	PB	Copper Alloys	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F
Orifice	SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-22	3.3.1.98	A
Orifice	SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.D-3	3.3.1.57	A
Orifice	SIA	Carbon Steel	Wetted Gas (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, 1
Piping	PB, SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	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	A

Table 3.3.2-6 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	PB	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	10 CFR Part 50, Appendix J (B2.1.30)	VII.D-2	3.3.1.53	E, 1
Piping	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.G-34	3.4.1.30	A
Piping	SIA	Carbon Steel	Wetted Gas (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, 1
Piping	SIA	Copper	Dry Gas (Int)	None	None	VII.J-3	3.3.1.98	A
Piping	SIA	Copper	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Piping	PB, SIA	Stainless Steel	Dry Gas (Int)	None	None	VII.J-18	3.3.1.98	A
Piping	PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	SIA	Stainless Steel	Plant Indoor Air (Int)	None	None	None	None	G
Tubing	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-18	3.3.1.98	A
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	SIA	Carbon Steel	Dry Gas (Int)	None	None	VII.J-22	3.3.1.98	A
Valve	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A

Table 3.3.2-6 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
Valve	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	A
Valve	PB	Carbon Steel	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Valve	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	10 CFR Part 50, Appendix J (B2.1.30)	VII.D-2	3.3.1.53	E, 1
Valve	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.G-34	3.4.1.30	A
Valve	SIA	Carbon Steel	Wetted Gas (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, 1
Valve	SIA	Copper Alloys	Dry Gas (Int)	None	None	VII.J-3	3.3.1.98	A
Valve	SIA	Copper Alloys	Plant Indoor Air (Ext)	None	None	V.F-3	3.2.1.53	A
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-18	3.3.1.98	A
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

Plant Specific Notes:

1 NUREG-1801, Section XI.M24, "Compressed Air Monitoring" applies to monitoring of the piping and components associated with the air compressors and dryers. Air compressor and dryer piping and components are not in-scope for WCGS. In-scope piping and components are associated with containment penetrations and nitrogen gas piping/components for backup closure of valves. Therefore NUREG-1801, Section XI.M24 is not considered appropriate to WCGS and alternate aging management programs are specified for the in-scope piping and components.

Table 3.3.2-7 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
Class 1 Piping <= 4in	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2) and One-Time Inspection Of ASME Code Class 1 Small-Bore Piping (B2.1.19)	IV.C2-1	3.1.1.70	B
Class 1 Piping <= 4in	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	LBS, PB	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F, 5

Table 3.3.2-7 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
Filter	FIL, PB	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
Filter	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Filter	FIL, PB	Cast Iron	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
Filter	FIL, PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Filter	FIL, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Filter	FIL, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D
Filter	FIL, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	D
Flexible Hoses	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-15	3.3.1.33	B
Flexible Hoses	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flow Element	LBS	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
Flow Element	LBS	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B
Flow Element	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B

Table 3.3.2-7 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
Flow Element	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Heat Exchanger Shell Side (HX # 41, 42, 43, 159)	PB, 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 Shell Side (HX # 41, 42, 43, 159)	PB, LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Heat Exchanger Shell Side (HX # 44)	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-15	3.3.1.33	D
Heat Exchanger Shell Side (HX # 44, 45, 46)	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Heat Exchanger Shell Side (HX # 47)	PB	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E
Heat Exchanger Shell Side (HX # 47)	PB	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D

Table 3.3.2-7 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 Shell Side (HX # 45, 46, 47)	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E
Heat Exchanger Shell Side (HX # 45, 46, 47)	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D
Heat Exchanger Tube Side (HX # 48)	HT, PB	Copper-Nickel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-12	3.3.1.26	D
Heat Exchanger Tube Side (HX # 48)	HT, PB	Copper-Nickel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G, 3
Heat Exchanger Tube Side (HX # 48)	HT, PB	Copper-Nickel	Treated Borated Water (Int)	Reduction of heat transfer	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G, 4
Heat Exchanger Tube Side (HX # 52, 55, 58)	HT, PB	Stainless Steel	Closed Cycle Cooling Water (Ext)	Reduction of heat transfer	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-3	3.3.1.52	B
Heat Exchanger Tube Side (HX # 51, 52, 54, 55, 57, 58, 160, 161)	HT, PB, LBS	Stainless Steel	Closed Cycle Cooling Water (Ext)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-10	3.3.1.50	D

Table 3.3.2-7 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 Tube Side (HX # 51, 52, 54, 55, 57, 58, 160, 161)	HT, PB, LBS	Stainless Steel	Closed Cycle Cooling Water (Ext)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	D
Heat Exchanger Tube Side (HX # 49)	PB	Stainless Steel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-15	3.3.1.33	D
Heat Exchanger Tube Side (HX # 53, 56, 59, 60, 65, 162)	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Heat Exchanger Tube Side (HX # 64, 67)	HT, PB	Stainless Steel	Treated Borated Water (Ext)	Reduction of heat transfer	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	H, 2
Heat Exchanger Tube Side (HX # 61, 62, 63, 64, 66, 67, 68)	HT, LBS, PB	Stainless Steel	Treated Borated Water (Ext)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E
Heat Exchanger Tube Side (HX # 61, 62, 63, 64, 66, 67, 68)	HT, LBS, PB	Stainless Steel	Treated Borated Water (Ext)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D

Table 3.3.2-7 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 Tube Side (HX # 52, 55, 58, 64, 67)	HT, PB	Stainless Steel	Treated Borated Water (Int)	Reduction of heat transfer	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	H, 2
Heat Exchanger Tube Side (HX # 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 160, 161, 162)	HT, LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E
Heat Exchanger Tube Side (HX # 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 160, 161, 162)	HT, LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D
Heat Exchanger Tube Side (HX # 50)	PB	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Heat Exchanger Tube Side (HX # 50)	PB	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-5	3.3.1.08	E

Table 3.3.2-7 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 Tube Side (HX # 50)	PB	Stainless Steel Cast Austenitic	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D
Instrument Bellows	PB	Stainless Steel	Borated Water Leakage (Int)	None	None	VII.J-16	3.3.1.99	A
Instrument Bellows	LBS	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	D
Instrument Bellows	LBS	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	D
Instrument Bellows	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Instrument Bellows	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Instrument Bellows	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Insulation	INS	Aluminum	Plant Indoor Air (Ext)	None	None	None	None	J, 6
Insulation	INS	Insulation Calcium Silicate	Plant Indoor Air (Ext)	None	None	None	None	J, 6
Insulation	INS	Insulation Foamglas	Plant Indoor Air (Ext)	None	None	None	None	J, 6
Insulation	INS	Stainless Steel	Plant Indoor Air (Ext)	None	None	None	None	J, 6
Orifice	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B
Orifice	LBS, PB, TH	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Orifice	PB, TH	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B

Table 3.3.2-7 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)	VII.E1-20	3.3.1.90	B
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	PB	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	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	A
Piping	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	PB, SIA	Stainless Steel	Borated Water Leakage (Int)	None	None	VII.J-16	3.3.1.99	A
Piping	PB	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
Piping	PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B
Piping	LBS, SIA	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B
Piping	PB, SIA	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Piping	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Treated Borated Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	VII.E1-16	3.3.1.02	A
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Piping	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B

Table 3.3.2-7 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
Pump	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
Pump	PB	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	B
Pump	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Pump	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VII.E1-7	3.3.1.09	E
Pump	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Sight Gauge	PB	Glass	Lubricating Oil (Int)	None	None	VII.J-10	3.3.1.93	A
Sight Gauge	PB	Glass	Plant Indoor Air (Ext)	None	None	VII.J-8	3.3.1.93	A
Sight Gauge	PB	Copper Alloy (Brass Copper < 85%)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-12	3.3.1.26	B
Sight Gauge	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Spacer Ring	LBS	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
Spacer Ring	LBS	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B
Spacer Ring	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-7 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
Spacer Ring	PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Spacer Ring	PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Tank	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
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	A
Tank	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Tank	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	D
Tank	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Thermowell	LBS, PB	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
Thermowell	LBS, PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B
Thermowell	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Thermowell	LBS	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Thermowell	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Thermowell	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Tubing	PB	Stainless Steel	Borated Water Leakage (Int)	None	None	VII.J-16	3.3.1.99	A
Tubing	LBS, PB	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
Tubing	LBS, PB	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B

Table 3.3.2-7 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
Tubing	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-15	3.3.1.33	B
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Tubing	LBS, PB	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Valve	LBS, PB	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
Valve	PB	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	B
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-12	3.3.1.26	B
Valve	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB, SIA	Stainless Steel	Borated Water Leakage (Int)	None	None	VII.J-16	3.3.1.99	A
Valve	LBS, PB, SIA	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B

Table 3.3.2-7 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
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Valve	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.E1-15	3.3.1.33	B
Valve	LBS, PB, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Cracking	ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD for Class 1 components (B2.1.1) and Water Chemistry (B2.1.2)	IV.C2-5	3.1.1.68	B
Valve	PB	Stainless Steel	Reactor Coolant (Int)	Loss of material	Water Chemistry (B2.1.2)	IV.C2-15	3.1.1.83	B
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Valve	LBS, PB, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B

<u>Notes for Table 3.3.2-7:</u>

<u>Standard Notes:</u>

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.
J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:
1 Not Used.
2 Reduction in heat transfer due to fouling is a potential aging effect for stainless steel heat exchanger components in treated borated water.
3 Loss of material due to pitting, crevice and galvanic corrosion is a potential aging effect for copper alloy in treated borated water.
4 Reduction in heat transfer due to fouling is a potential aging effect for copper alloy heat exchanger components in treated borated water.
5 This non-NUREG-1801 line was added to address stainless steel closure bolting in a borated water leakage environment.
6 NUREG-1801 does not consider mechanical insulation. The in-scope thermal insulation is located in areas with non-aggressive environments (meaning the insulation is not exposed to contaminants). Based on the review of the site operating experience, it was determined that for stainless steel insulation, closed cell foam, quilted fiberglass insulation, calcium silicate and insulation jacketing in non-aggressive environments, there were no aging effects requiring management.

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-7	3.3.1.55	A
Damper	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-2	3.3.1.56	A
Damper	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Damper	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Damper	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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
Damper	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	C
Ductwork	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-2	3.3.1.56	A
Ductwork	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	Hardening and loss of strength	External Surfaces Monitoring Program (B2.1.20)	VII.F2-7	3.3.1.11	E
Flex Connectors	PB	Elastomer	Ventilation Atmosphere (Int)	Hardening and loss of strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-7	3.3.1.11	E

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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
Heat Exchanger Shell Side (HX # 69, 71, 73, 75, 77, 79)	HT	Aluminum	Ventilation Atmosphere (Ext)	None	None	VII.J-1	3.3.1.95	C
Heat Exchanger Shell Side (HX # 70, 72, 74, 76, 78, 80)	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Shell Side (HX # 70, 72, 74, 76, 78, 80)	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Tube Side (HX # 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92)	LBS	Copper	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	D
Heat Exchanger Tube Side (HX # 81, 83, 84, 85, 86)	LBS	Copper	Plant Indoor Air (Ext)	None	None	None	None	G
Heat Exchanger Tube Side (HX # 82, 87, 88, 89, 90, 91, 92)	LBS	Copper	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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
Heat Exchanger Tube Side (HX # 93, 95, 97, 99, 101, 103)	PB	Copper-Nickel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 93, 95, 97, 99, 101, 103)	PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104)	HT, PB	Copper-Nickel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-3	3.3.1.82	A
Heat Exchanger Tube Side (HX # 94, 96, 98, 100, 102, 104)	HT, PB	Copper-Nickel	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-6	3.3.1.83	A
Heat Exchanger Tube Side (HX # 94, 96, 98, 100, 102, 104)	HT, PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Piping	LBS	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 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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	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	A
Piping	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	SIA	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Piping	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Piping	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Piping	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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
Tank	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Tank	LBS	Stainless Steel	Ventilation Atmosphere (Ext)	None	None	VII.J-15	3.3.1.94	C, 1
Tubing	PB	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
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	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
Valve	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-6	3.2.1.15	D
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Copper Alloys	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	B

Table 3.3.2-8 Auxiliary Systems – Summary of Aging Management Evaluation - Auxiliary Building 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
Valve	LBS	Copper Alloys	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	None	None	G
Valve	LBS	Copper Alloys	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	V.C-4	3.2.1.03	D
Valve	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Notes for Table 3.3.2-8:

Standard Note Text

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

G Environment not in NUREG-1801 for this component and material.

Plant Specific Note

1 The NUREG-1801 component type "piping" is used to evaluate the material and environment combination for the component "tank." The tanks evaluated are actually exhaust scrubbers.

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building HVAC System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Adsorber	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-2	3.3.1.56	A
Adsorber	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-3	3.3.1.72	A
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-4	3.3.1.55	A
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Compressor	PB	Cast Iron	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C
Compressor	PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Damper	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-2	3.3.1.56	A

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Damper	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-3	3.3.1.72	A
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Damper	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Ductwork	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-2	3.3.1.56	A
Ductwork	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-3	3.3.1.72	A
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Fan	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-2	3.3.1.56	A
Fan	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-3	3.3.1.72	A
Fan	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	None	None	None	None	H, 1
Flex Connectors	PB	Elastomer	Ventilation Atmosphere (Int)	None	None	None	None	H, 1
Heat Exchanger Shell Side (HX # 105, 108)	HT	Aluminum	Ventilation Atmosphere (Ext)	None	None	VII.J-1	3.3.1.95	C
Heat Exchanger Shell Side (HX # 106, 109)	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Heat Exchanger Shell Side (HX # 106, 109)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-10	3.3.1.59	A
Heat Exchanger Shell Side (HX # 107, 110)	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Shell Side (HX # 107, 110)	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Tube Side (HX # 116, 121)	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C
Heat Exchanger Tube Side (HX # 116, 121)	PB	Carbon Steel	Raw Water (Ext)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-5	3.3.1.77	A
Heat Exchanger Tube Side (HX # 111, 112, 113)	LBS	Copper	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-8	3.3.1.51	B

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Heat Exchanger Tube Side (HX # 114, 119)	HT, PB	Copper	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	C
Heat Exchanger Tube Side (HX # 111, 112, 113, 114, 119)	HT, LBS, PB	Copper	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-16	3.3.1.25	E
Heat Exchanger Tube Side (HX # 115, 120)	HT, PB	Copper Alloys	Dry Gas (Ext)	None	None	VII.J-4	3.3.1.97	C
Heat Exchanger Tube Side (HX # 118, 123)	PB	Copper Alloys	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	C
Heat Exchanger Tube Side (HX # 117, 122)	PB	Copper Alloys	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-16	3.3.1.25	E
Heat Exchanger Tube Side (HX # 117, 122)	PB	Copper Alloys	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-16	3.3.1.25	E

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Heat Exchanger Tube Side (HX # 115, 117, 120, 122)	HT, PB	Copper Alloys	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-3	3.3.1.82	A
Heat Exchanger Tube Side (HX # 115, 120)	HT, PB	Copper Alloys	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-6	3.3.1.83	A
Heat Exchanger Tube Side (HX # 118, 123)	PB	Copper Alloys	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-16	3.3.1.25	E
Piping	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-20	3.3.1.47	B
Piping	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Piping	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F1-3	3.3.1.72	A
Piping	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-20	3.3.1.47	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Tubing	LBS	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
Tubing	LBS, PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	A, 2
Valve	LBS	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-20	3.3.1.47	B
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-20	3.3.1.47	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-9 Auxiliary Systems – Summary of Aging Management Evaluation - Control Building 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
Valve	LBS	Copper Alloys	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F1-15	3.3.1.51	B
Valve	LBS	Copper Alloys	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F1-16	3.3.1.25	E
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	A, 2

Notes for Table 3.3.2-9:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

H Aging effect not in NUREG-1801 for this component, material and environment combination.

Plant Specific Notes:

1 Ambient temperature in HVAC equipment spaces is expected to be below 95 degrees. Below 95 degrees, thermal aging of elastomers is not considered significant.

2 Stainless steel valves and tubing in HVAC systems with an internal environment of Ventilation Atmosphere are used for air sampling and as differential pressure instrument lines. Condensation is not expected in these applications. The NUREG-1801 line referenced for the aging evaluation is VII.J-15 which is for Air-Uncontrolled (external). In ventilation systems, the internal and external air environments are evaluated as equivalent.

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building HVAC System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Adsorber	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-2	3.3.1.56	A
Adsorber	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G, 3
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-4	3.3.1.55	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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Damper	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building 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
Ductwork	PB	Carbon Steel	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Ductwork	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-2	3.3.1.56	A
Fan	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Fan	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	Hardening and loss of strength	External Surfaces Monitoring Program (B2.1.20)	VII.F2-7	3.3.1.11	E

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building 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
Flex Connectors	PB	Elastomer	Ventilation Atmosphere (Int)	Hardening and loss of strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-7	3.3.1.11	E
Heat Exchanger Shell Side (HX # 124)	HT	Aluminum	Ventilation Atmosphere (Ext)	None	None	VII.J-1	3.3.1.95	C
Heat Exchanger Shell Side (HX # 125)	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Shell Side (HX # 125)	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Tube Side (HX # 126, 127, 128, 129, 130)	LBS	Copper	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	D
Heat Exchanger Tube Side (HX # 126, 127, 128, 129, 130)	LBS	Copper	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 131)	PB	Copper-Nickel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building 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
Heat Exchanger Tube Side (HX # 131)	PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 131, 132)	HT, PB	Copper-Nickel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-3	3.3.1.82	A
Heat Exchanger Tube Side (HX # 132)	HT, PB	Copper-Nickel	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-6	3.3.1.83	A
Heat Exchanger Tube Side (HX # 132)	HT, PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heater	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Heater	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	A, 2
Piping	LBS	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
Piping	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Piping	LBS, PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building 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	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Piping	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	A, 1
Valve	LBS	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
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B

Table 3.3.2-10 Auxiliary Systems – Summary of Aging Management Evaluation - Fuel Building 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
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Copper Alloys	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	B
Valve	LBS	Copper Alloys	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Valve	PB	Stainless Steel	Ventilation Atmosphere (Int)	None	None	VII.J-15	3.3.1.94	A, 1

Notes for Table 3.3.2-10:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

G Environment not in NUREG-1801 for this component and material.

Plant Specific Notes:

1 Stainless steel valves and tubing in HVAC systems with an internal environment of Ventilation Atmosphere are used for air sampling and as differential pressure instrument lines. Condensation is not expected in these applications. The NUREG-1801 line referenced for the aging evaluation is VII.J-15 which is for Air-Uncontrolled (external). In ventilation systems, the internal and external air environments are evaluated as equivalent.

2 The component is a stainless steel electric heater housing with an internal environment of Ventilation Atmosphere. Condensation is not expected. NUREG-1801 line VII.J-15 is for Air-Uncontrolled (external). In ventilation systems, the internal and external air environments are evaluated as equivalent.

3 NUREG-1801 line VII.F2-3 has an internal environment of condensation. Unlike other carbon steel ventilation components, it is unlikely that an adsorber would have condensation as an internal environment. The adsorbers' first stage contain moisture separators to ensure moisture does not impregnate the charcoal filters. Therefore, a separate (non-condensation) row needed to be created.

Table 3.3.2-12 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Buildings 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	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, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-7	3.3.1.55	A
Damper	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-2	3.3.1.56	A
Damper	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-3	3.3.1.72	A
Damper	FB	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Damper	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Damper	FB, PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C

Table 3.3.2-12 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Buildings 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
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Ductwork	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C
Fan	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	Hardening and loss of strength	External Surfaces Monitoring Program (B2.1.20)	VII.F2-7	3.3.1.11	E
Flex Connectors	PB	Elastomer	Ventilation Atmosphere (Int)	Hardening and loss of strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-7	3.3.1.11	E
Heat Exchanger Shell Side (HX # 133)	HT	Aluminum	Ventilation Atmosphere (Ext)	None	None	VII.J-1	3.3.1.95	C
Heat Exchanger Shell Side (HX # 134)	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	C

Table 3.3.2-12 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Buildings 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
Heat Exchanger Shell Side (HX # 134)	PB	Carbon Steel (Galvanized or Coated)	Ventilation Atmosphere (Int)	None	None	VII.J-6	3.3.1.92	C
Heat Exchanger Tube Side (HX # 135, 136)	LBS	Copper	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	B
Heat Exchanger Tube Side (HX # 135, 136)	LBS	Copper	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 137)	PB	Copper-Nickel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 137)	PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Heat Exchanger Tube Side (HX # 137, 138)	HT, PB	Copper-Nickel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-3	3.3.1.82	A
Heat Exchanger Tube Side (HX # 138)	HT, PB	Copper-Nickel	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-6	3.3.1.83	A

Table 3.3.2-12 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Buildings 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
Heat Exchanger Tube Side (HX # 138)	HT, PB	Copper-Nickel	Ventilation Atmosphere (Ext)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-14	3.3.1.25	E
Piping	LBS	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
Piping	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Piping	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	PB	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Tubing	LBS	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
Tubing	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	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 3.3.2-12 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Buildings 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
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C2-8	3.3.1.85	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-18	3.3.1.47	B
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Copper Alloy (Brass Copper < 85%)	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.F2-13	3.3.1.51	B
Valve	LBS	Copper Alloy (Brass Copper < 85%)	Closed Cycle Cooling Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.F2-15	3.3.1.84	B
Valve	LBS	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.F2-14	3.3.1.25	E

<u>Notes for Table 3.3.2-12:</u>

<u>Standard Notes:</u>

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

<u>Plant Specific Notes:</u>

None

Table 3.3.2-14 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	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.G-25	3.3.1.19	C
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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Filter	FIL, PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Filter	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Flame Arrestor	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Flame Arrestor	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Flexible Hoses	PB	Elastomer	Dry Gas (Int)	None	None	None	None	G, 1
Flexible Hoses	PB	Elastomer	Plant Indoor Air (Ext)	None	None	None	None	G, 1

Table 3.3.2-14 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
Flexible Hoses	PB	Elastomer	Dry Gas (Int)	Hardening – loss of strength	Fire Protection (B2.1.12)	None	None	G
Flexible Hoses	PB	Elastomer	Plant Indoor Air (Ext)	Hardening – loss of strength	Fire Protection (B2.1.12)	VII.F2-7	3.3.1.11	E
Hose Station	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Hose Station	PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-12	3.3.1.70	E, 2
Hose Station	PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-13	3.3.1.84	B
Piping	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.G-25	3.3.1.19	A
Piping	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Piping	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	A
Piping	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-14 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	LBS, PB	Carbon Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Piping	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	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 (Galvanized or Coated)	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	PB	Carbon Steel (Galvanized or Coated)	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	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Piping	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Int)	None	None	VII.J-6	3.3.1.92	A
Piping	PB	Carbon Steel (Galvanized or Coated)	Raw Water (Ext)	Loss of material	Fire Water System (B2.1.13)	VII.G-24	3.3.1.68	B

Table 3.3.2-14 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 (Galvanized or Coated)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
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	A
Piping	PB	Cast Iron	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Piping	PB	Cast Iron (Galvanized or Coated)	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Piping	PB	Cast Iron (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Piping	PB	Copper	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-11	3.3.1.26	B
Piping	PB	Copper	Fuel Oil (Int))	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.G-10	3.3.1.32	B
Piping	PB	Copper	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A

Table 3.3.2-14 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	Copper	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-12	3.3.1.70	E, 2
Piping	PB	Copper Alloy (Brass Copper < 85%)	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.G-10	3.3.1.32	B
Piping	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Piping	PB	Ductile Iron	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.G-25	3.3.1.19	A
Piping	PB	Ductile Iron	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Pump	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Pump	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-14 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
Pump	PB	Carbon Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Pump	PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Pump	PB	Cast Iron	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Pump	PB	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Pump	PB	Cast Iron (Gray Cast Iron)	Raw Water (Ext)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-14	3.3.1.85	B
Pump	PB	Cast Iron (Gray Cast Iron)	Raw Water (Ext)	Loss of material	Fire Water System (B2.1.13)	VII.G-24	3.3.1.68	B
Pump	PB	Cast Iron (Gray Cast Iron)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-14	3.3.1.85	B
Pump	PB	Cast Iron (Gray Cast Iron)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2

Table 3.3.2-14 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
Pump	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	PB	Stainless Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-19	3.3.1.69	E, 2
Sight Gauge	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Sight Gauge	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Sight Gauge	PB	Glass	Fuel Oil (Int)	None	None	VII.J-9	3.3.1.93	A
Sight Gauge	PB	Glass	Plant Indoor Air (Ext)	None	None	VII.J-8	3.3.1.93	A
Silencer	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
Silencer	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Sprinkler Head	PB, SP	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-13	3.3.1.84	B
Strainer	FIL, PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B

Table 3.3.2-14 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
Strainer	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Strainer	FIL, PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Strainer	FIL, PB	Carbon Steel (Galvanized or Coated)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Strainer	FIL, PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Strainer	FIL, PB	Cast Iron	Plant Indoor Air (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Strainer	FIL, PB	Cast Iron	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Tank	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C
Tank	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	D
Tank	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-14 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
Tubing	PB	Copper	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Tubing	PB	Copper	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-12	3.3.1.70	E, 2
Tubing	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Tubing	PB	Stainless Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.G-17	3.3.1.32	B
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	PB	Stainless Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-19	3.3.1.69	E, 2
Valve	PB	Bronze	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	A
Valve	PB	Bronze	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.G-11	3.3.1.26	B
Valve	PB	Bronze	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB	Bronze	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-12	3.3.1.70	E, 2

Table 3.3.2-14 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
Valve	PB	Bronze	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-9	3.3.1.28	E
Valve	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fire Protection (B2.1.12) and Fuel Oil Chemistry (B2.1.14)	VII.G-21	3.3.1.64	B
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS, PB	Carbon Steel	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Valve	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	A
Valve	PB	Carbon Steel (Galvanized or Coated)	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Valve	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Valve	PB	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Int)	None	None	VII.J-6	3.3.1.92	A

Table 3.3.2-14 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
Valve (including fire hydrant)	PB	Cast Iron	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	A
Valve	LBS, PB	Cast Iron	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve (including fire hydrant)	LBS, PB	Cast Iron	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Valve	PB	Cast Iron	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	A
Valve	PB	Cast Iron (Gray Cast Iron)	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	A
Valve	PB	Cast Iron (Gray Cast Iron)	Buried (Ext)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-15	3.3.1.85	B
Valve	PB	Cast Iron (Gray Cast Iron)	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.G-25	3.3.1.19	A
Valve	PB	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Cast Iron (Gray Cast Iron)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-14	3.3.1.85	B

Table 3.3.2-14 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
Valve	PB	Cast Iron (Gray Cast Iron)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-24	3.3.1.68	E, 2
Valve	PB	Cast Iron (Gray Cast Iron)	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-23	3.3.1.71	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Int)	None	None	None	None	G
Valve	PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Fire Water System (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.G-12	3.3.1.70	E, 2
Valve	PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.G-13	3.3.1.84	B

Notes for Table 3.3.2-14:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

G Environment not in NUREG-1801 for this component and material.

Plant Specific Notes:

1 Ambient temperature in control building spaces is expected to be below 95 degrees. Below 95 degrees, thermal aging of elastomers is not considered significant.

2 NUREG-1801 recommends that the aging of this component, with an internal environment of raw water, be managed by Section XI.M27, "Fire Water System." The aging management of the internal surfaces exposed to raw water for this component is managed by both Fire Water System program (B2.1.13) and Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22).

Table 3.3.2-15 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine Fuel Oil Storage and Transfer 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 preload	Bolting Integrity (B2.1.7)	None	None	H, 1
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	Carbon Steel	Fuel Oil (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	G, 2
Closure Bolting	PB	Carbon Steel	Fuel Oil (Ext)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	D
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VII.I-4	3.3.1.43	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Flame Arrestor	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B
Flame Arrestor	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.H1-8	3.3.1.60	A
Instrument	PB	Glass	Fuel Oil (Int)	None	None	VII.J-9	3.3.1.93	A
Instrument	PB	Glass	Plant Indoor Air (Ext)	None	None	VII.J-8	3.3.1.93	A
Piping	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.H1-8	3.3.1.60	A
Piping	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.H1-9	3.3.1.19	A
Piping	PB	Carbon Steel	Fuel Oil (Ext)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B

Table 3.3.2-15 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine Fuel Oil Storage and Transfer 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	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B
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	A
Pump	PB	Stainless Steel	Fuel Oil (Ext)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-6	3.3.1.32	B
Pump	PB	Stainless Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-6	3.3.1.32	B
Strainer	FIL, PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B
Strainer	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Tank	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VII.H1-9	3.3.1.19	C
Tank	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B
Tank	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Tubing	PB	Stainless Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-6	3.3.1.32	B
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-15 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine Fuel Oil Storage and Transfer System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	PB	Carbon Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H1-10	3.3.1.20	B
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Notes for Table 3.3.2-15:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

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 NUREG-1801 line VII.I-5 has loss of preload/thermal effects, gasket creep, and self-loosening for steel closure bolting in indoor uncontrolled (external) air. This aging effect/mechanism would also exist in the environment or outdoor (external) air, therefore this non-NUREG-1801 line has been added to also address loss of preload for the component/material/environment of NUREG-1801 line VII.I-1.

2 NUREG-1801 line VII.I-5 has loss of preload/thermal effects, gasket creep, and self-loosening for steel closure bolting in indoor uncontrolled (external) air. This aging effect/mechanism would also exist in the environment of fuel oil (external), therefore this non-NUREG-1801 line has been added.

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Expansion Joint	PB	Stainless Steel	Diesel Exhaust (Int)	Cracking	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.H2-1	3.3.1.06	E
Expansion Joint	PB	Stainless 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
Expansion Joint	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Filter	FIL, PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Filter	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
Filter	FIL, PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B
Filter	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Filter	FIL, PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F4-2	3.3.1.72	A
Flex Connectors	PB	Elastomer	Closed Cycle Cooling Water (Int)	Hardening and loss of strength	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Flex Connectors	PB	Elastomer	Fuel Oil (Int)	None	None	None	None	G,5
Flex Connectors	PB	Elastomer	Lubricating Oil (Int)	None	None	None	None	G,5
Flex Connectors	PB	Elastomer	Plant Indoor Air (Ext)	Hardening and loss of strength	External Surfaces Monitoring Program (B2.1.20)	VII.F4-6	3.3.1.11	A
Heat Exchanger Shell Side (HX # 139, 140)	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	D
Heat Exchanger Shell Side (HX # 141)	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-5	3.3.1.21	B
Heat Exchanger Shell Side (HX # 139, 140, 141)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine 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 Tube Side (HX # 142, 145, 148)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Heat Exchanger Tube Side (HX # 142, 145, 148)	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-5	3.3.1.77	A
Heat Exchanger Tube Side (HX # 144, 147)	HT, PB	Copper Alloy (Brass Copper < 85%)	Closed Cycle Cooling Water (Ext)	Reduction of heat transfer	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-2	3.3.1.52	B
Heat Exchanger Tube Side (HX # 143, 144, 146, 147)	HT, PB	Copper Alloy (Brass Copper < 85%)	Closed Cycle Cooling Water (Ext)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-8	3.3.1.51	D
Heat Exchanger Tube Side (HX # 143, 144, 146, 147)	HT, PB	Copper Alloy (Brass Copper < 85%)	Closed Cycle Cooling Water (Ext)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.H2-12	3.3.1.84	D
Heat Exchanger Tube Side (HX # 150)	HT, PB	Copper Alloy (Brass Copper < 85%)	Lubricating Oil (Ext)	Reduction of heat transfer	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	None	None	H, 4

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine 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 Tube Side (HX # 149, 150)	HT, PB	Copper Alloy (Brass Copper < 85%)	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-10	3.3.1.26	D
Heat Exchanger Tube Side (HX # 144, 147, 150)	HT, PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Reduction of heat transfer	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-6	3.3.1.83	A
Heat Exchanger Tube Side (HX # 143, 144, 146, 147, 149, 150)	HT, PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.H2-11	3.3.1.80	C
Heat Exchanger Tube Side (HX # 143, 144, 146, 147, 149, 150)	HT, PB	Copper Alloy (Brass Copper < 85%)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.H2-13	3.3.1.84	D
Heater	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	D
Heater	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	D
Heater	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Insulation	INS	Insulation Ceramic Fibers	Plant Indoor Air (Ext)	None	None	None	None	J, 2

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine 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	Stainless Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H2-16	3.3.1.32	B
Orifice	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Orifice	PB	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
Piping	PB, SIA	Carbon Steel	Atmosphere/ weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	A
Piping	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	B
Piping	SIA	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	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.H2.21	3.3.1.71	A
Piping	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Piping	PB, 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.H2-20	3.3.1.14	B
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	A

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine 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	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.H2-22	3.3.1.76	A
Piping	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F4-2	3.3.1.72	C
Piping	PB, SIA	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.H2-21	3.3.1.71	A
Pump	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	B
Pump	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
Pump	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B
Pump	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Pump	PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.H2-21	3.3.1.71	A
Pump	PB	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
Pump	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Separator	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B
Separator	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Sight Gauge	PB	Glass	Lubricating Oil (Int)	None	None	VII.J-10	3.3.1.93	A
Sight Gauge	PB	Glass	Plant Indoor Air (Ext)	None	None	VII.J-8	3.3.1.93	A
Silencer	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
Silencer	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Silencer	PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F4-2	3.3.1.72	C
Strainer	FIL, PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Strainer	FIL, 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
Strainer	FIL, PB	Carbon Steel	Lubricating Oil (Ext)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B
Strainer	FIL, PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Strainer	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Strainer	FIL, PB	Carbon Steel	Ventilation Atmosphere (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F4-2	3.3.1.72	C
Tank	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	B
Tank	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	C
Tank	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	D
Tank	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Thermowell	PB	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
Thermowell	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-17	3.3.1.33	B
Thermowell	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	PB	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
Tubing	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Tubing	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-17	3.3.1.33	B
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	PB	Carbon Steel	Closed Cycle Cooling Water (Int)	Loss of material	Closed-Cycle Cooling Water System (B2.1.10)	VII.H2-23	3.3.1.47	B
Valve	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	B
Valve	PB	Carbon Steel	Dry Gas (Int)	None	None	VII.J-23	3.3.1.97	A
Valve	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
Valve	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-20	3.3.1.14	B
Valve	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	PB	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.H2-22	3.3.1.76	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Dry Gas (Int)	None	None	VII.J-4	3.3.1.97	A
Valve	PB	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB	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
Valve	PB	Stainless Steel	Dry Gas (Int)	None	None	VII.J-19	3.3.1.97	A
Valve	PB	Stainless Steel	Fuel Oil (Int)	Loss of material	Fuel Oil Chemistry (B2.1.14) and One-Time Inspection (B2.1.16)	VII.H2-16	3.3.1.32	B

Table 3.3.2-16 Auxiliary Systems – Summary of Aging Management Evaluation - Emergency Diesel Engine System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	PB	Stainless Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VII.H2-17	3.3.1.33	B
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	PB	Stainless Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G, 1

Notes for Table 3.3.2-16:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

G Environment not in NUREG-1801 for this component and material.

J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1 This non-NUREG-1801 line is based upon NUREG-1801 line VII.F2-1 with a selected aging management program Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) for the evaluation of stainless steel piping with an internal environment of condensation.

2 NUREG-1801 does not consider mechanical insulation. The in-scope thermal insulation is located in areas with non-aggressive environments (meaning the insulation is not exposed to contaminants). Based on the review of the site operating experience, it was determined that for stainless steel insulation, closed cell foam, quilted fiberglass insulation, calcium silicate, ceramic fiber and insulation jacketing in non-aggressive environments, there were no aging effects requiring management.

3 Not Used.

4 This non-NUREG-1801 line is based upon NUREG-1801 line V.A-12. NUREG-1801 does not consider copper alloy heat exchanger tubes in lubricating oil for Auxiliary Systems.

5 Flexible hoses are nitrile (excellent resistance to fuel oil). EPRI Mechanical Tools, Appendix C, section 2.1.6, non-metals in oil and fuel environment, states that aging management of elastomers is not a concern in lubricating oil and fuel oil environments.

Table 3.3.2-18 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	LBS	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	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Flexible Hoses	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flexible Hoses	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, 1
Piping	LBS	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Piping	LBS	Carbon Steel (Galvanized or Coated)	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, 1
Piping	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	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, 1
Valve	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A

Table 3.3.2-18 Auxiliary Systems – Summary of Aging Management Evaluation - Oily Waste System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	LBS	Cast Iron (Gray Cast Iron)	Raw Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VII.C1-11	3.3.1.85	B
Valve	LBS	Cast Iron (Gray Cast Iron)	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, 1
Valve	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	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,1

Notes for Table 3.3.2-18

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.

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.

Plant Specific Notes:

1 The component environment is floor and equipment drains that has been evaluated as a raw water environment. Loss of material on internal component surface exposed to floor and equipment drains environment is managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22) instead of Open-Cycle Cooling Water System program (B2.1.9).

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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	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, SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VII.I-5	3.3.1.45	B
Closure Bolting	LBS	Copper Alloys	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F
Closure Bolting	LBS	Copper Alloys	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	C
Closure Bolting	LBS	Stainless Steel	Borated Water Leakage (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	None	None	F
Flow Element	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Flow Element	LBS	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Flow Element	SIA	Stainless Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-1	3.3.1.27	E
Orifice	LBS	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
Orifice	LBS	Stainless Steel	Closed Cycle Cooling Water (Int)	Cracking	Closed-Cycle Cooling Water System (B2.1.10)	VII.C2-11	3.3.1.46	B

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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
Orifice	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Orifice	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
Piping	LBS	Bronze	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Piping	LBS	Bronze	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
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
Piping	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	B
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	A
Piping	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A
Piping	LBS	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, 1
Piping	SIA	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Ext)	None	None	VII.J-6	3.3.1.92	A
Piping	LBS	Carbon Steel (Galvanized or Coated)	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	LBS	Carbon Steel (Galvanized or Coated)	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, 5
Piping	LBS	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Piping	LBS	Copper Alloy (Brass Copper < 85%)	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Piping	LBS	Polyvinyl Chloride (PVC)	Atmosphere/ Weather (Ext)	None	None	None	None	F
Piping	LBS	Polyvinyl Chloride (PVC)	Raw Water (Int)	None	None	None	None	F
Piping	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Piping	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, 1
Piping	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
Piping	SIA	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Piping	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Piping	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Piping	SIA	Stainless Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G, 2
Piping	SIA	Stainless Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-1	3.3.1.27	E
Pump	LBS	Cast Iron	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-9	3.3.1.58	A

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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
Pump	LBS	Cast Iron	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, 4
Pump	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Pump	LBS	Stainless Steel Cast Austenitic	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
Strainer	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Strainer	LBS	Stainless Steel Cast Austenitic	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	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	C
Tank	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
Tubing	LBS	Copper	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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
Tubing	LBS	Copper	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Tubing	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Tubing	LBS	Stainless Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-15	3.3.1.79	A
Tubing	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
Valve	LBS	Bronze	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	LBS	Bronze	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Valve	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
Valve	LBS	Carbon Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	B
Valve	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VII.I-8	3.3.1.58	A
Valve	LBS	Carbon Steel	Raw Water (Int)	Loss of material	Open-Cycle Cooling Water System (B2.1.9)	VII.C1-19	3.3.1.76	A

Table 3.3.2-21 *Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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
Valve	LBS	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, 1
Valve	LBS	Copper Alloy (Brass Copper < 85%)	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	LBS	Copper Alloy (Brass Copper < 85%)	Potable Water (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	None	None	G
Valve	LBS	Polyvinyl Chloride (PVC)	Atmosphere/ Weather (Ext)	None	None	None	None	F
Valve	LBS	Polyvinyl Chloride (PVC)	Raw Water (Int)	None	None	None	None	F
Valve	LBS	Stainless Steel	Demineralized Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B
Valve	LBS, SIA	Stainless Steel	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	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

Table 3.3.2-21 Auxiliary Systems – Summary of Aging Management Evaluation - Miscellaneous Auxiliary Systems In-Scope ONLY based on 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
Valve	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, 1
Valve	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VII.E1-17	3.3.1.91	B
Valve	LBS, SIA	Stainless Steel	Treated Borated Water (Int)	Cracking	Water Chemistry (B2.1.2)	VII.E1-20	3.3.1.90	B
Valve	SIA	Stainless Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VII.F2-1	3.3.1.27	E
Valve	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VII.J-15	3.3.1.94	A
Valve	LBS	Stainless Steel Cast Austenitic	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

Notes for Table 3.3.2-21:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

Plant Specific Notes:

1 The component environment is secondary liquid waste that has been evaluated as a raw water environment. Loss of material on internal component surface exposed to a secondary liquid waste environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) instead of Open-Cycle Cooling Water program (B2.1.9).

2 This non-NUREG-1801 line is based upon NUREG-1801 line VII.F2-1 with a selected aging management program Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) for the evaluation of stainless steel piping with an internal environment of condensation.

3 The component environment is chemical and detergent drains and has been evaluated as a raw water environment. Loss of material on internal component surfaces exposed to a chemical and detergent drains environment will be managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) instead of Open-Cycle Cooling Water program (B2.1.9).

4 The component environment is yard drains. Yard drains consists of rain and ground water and has been evaluated as a raw water environment. Loss of material on internal component surfaces exposed to a yard drains environment is managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components program (B2.1.22) instead of Open-Cycle Cooling Water program (B2.1.9).

5. The component environment is floor and equipment drains that have been evaluated as a raw water environment. Loss of material on internal component surface exposed to floor and equipment drains environment is managed by Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22) instead of Open-Cycle Cooling Water System program (B2.1.9).

These tables use the format of Table 2 discussed in Section 3.0.

3.4.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

The materials from which the component types are fabricated, the environments to which they are exposed, the potential aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above systems in the following subsections.

3.4.2.1.1 Main Turbine System

Materials

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

- Carbon Steel
- Stainless Steel

Environment

The main turbine system component types are exposed to the following environments:

- Plant Indoor Air
- Secondary Water

Aging Effects Requiring Management

The following main turbine 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 turbine system component types:

- Bolting Integrity (B2.1.7)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.4.2.1.2 Main Steam System

Materials

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

- Aluminum
- Carbon Steel
- Cast Iron (Gray Cast Iron)
- Copper
- Glass
- Insulation Calcium Silicate
- Stainless Steel

Environment

The main steam system component types are exposed to the following environments:

- Dry Gas
- Plant Indoor Air
- Secondary Water
- Wetted Gas
- Atmosphere/Weather

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)
- 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)
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
- Stainless Steel

Environment

The feedwater system component types are exposed to the following environments:

- 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)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

3.4.2.1.4 Condensate System

Materials

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

- Carbon Steel
- Stainless Steel

Environment

The condensate system components are exposed to the following environments:

- Atmosphere / Weather
- Plant Indoor Air
- Secondary Water

Aging Effects Requiring Management

The following condensate 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 condensate system component types:

- Bolting Integrity (B2.1.7)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

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
- Insulation Calcium Silicate
- Insulation Foamglas

- Stainless Steel
- Stainless Steel Cast Austenitic

Environment

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

- Plant Indoor Air
- Secondary Water

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)
- External Surfaces Monitoring Program (B2.1.20)
- Flow-Accelerated Corrosion (B2.1.6)
- One-Time Inspection (B2.1.16)
- Water Chemistry (B2.1.2)

Table 3.4.2-1 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Turbine 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	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Piping	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Piping	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-16	3.4.1.02	B
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Tubing	PB	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2)	VIII.A-10	3.4.1.39	B
Tubing	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2)	VIII.A-12	3.4.1.37	B
Valve	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Valve	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.A-16	3.4.1.02	B
Valve	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.A-17	3.4.1.29	B

Notes for Table 3.4.2-1:
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 3.4.2-2 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
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Flexible Hoses	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Flexible Hoses	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B
Flexible Hoses	LBS	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-5	3.4.1.14	B
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
Orifice	LBS, PB, TH	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Orifice	LBS, PB, TH	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B
Orifice	LBS, PB, TH	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-5	3.4.1.14	B
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	A
Piping	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B

Table 3.4.2-2 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam 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	Secondary Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	VIII.B1-10	3.4.1.01	A
Piping	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	B
Piping	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Pump	LBS	Cast Iron (Gray Cast Iron)	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	B
Pump	LBS	Cast Iron (Gray Cast Iron)	Secondary Water (Int)	Loss of material	Selective Leaching of Materials (B2.1.17)	VIII.E-23	3.4.1.36	B
Sight Gauge	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Sight Gauge	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1.11	3.4.1.04	B
Sight Gauge	LBS	Glass	Plant Indoor Air (Ext)	None	None	V.F-6	3.2.1.52	A

Table 3.4.2-2 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Sight Gauge	LBS	Glass	Secondary Water (Int)	None	None	VIII.I-8	3.4.1.40	A
Silencer	DF	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	C
Silencer	DF	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-8	3.4.1.28	A
Strainer	FIL, LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Strainer	FIL, PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B
Strainer	FIL, LBS, PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	B
Tank	LBS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Tank	LBS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	D
Trap	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Trap	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B

Table 3.4.2-2 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Trap	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	B
Trap	LBS	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	A
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Tubing	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B
Turbine	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Turbine	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	D
Valve	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	A
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.B1-9	3.4.1.29	B
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-11	3.4.1.04	B

Table 3.4.2-2 Steam and Power Conversion System – Summary of Aging Management Evaluation – Main Steam System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	LBS, PB	Carbon Steel	Wetted Gas (Int)	Loss of material	Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components (B2.1.22)	VIII.B1-7	3.4.1.30	A
Valve	PB	Copper	Dry Gas (Int)	None	None	VIII.I-3	3.4.1.44	A
Valve	PB	Copper	Plant Indoor Air (Ext)	None	None	VIII.I-2	3.4.1.41	A
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Valve	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.B1-4	3.4.1.16	B

Notes for Table 3.4.2-2:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

None

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	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Flow Element	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Flow Element	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	B
Flow Element	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.D1-9	3.4.1.29	B
Heat Exchanger Tube Side (HX # 151)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Heat Exchanger Tube Side (HX # 152)	PB	Carbon Steel	Secondary Water (Ext)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	D
Heat Exchanger Tube Side (HX # 151, 152)	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	D

Table 3.4.2-3 Steam and Power Conversion System – Summary of Aging Management Evaluation – Feedwater 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 Shell Side (HX # 158)	NSRS	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	D
Heat Exchanger Shell Side (HX # 158)	NSRS	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Heat Exchanger Tube Side (HX # 153)	PB	Stainless Steel	Secondary Water (Ext)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-4	3.4.1.16	D
Heat Exchanger Tube Side (HX # 153)	PB	Stainless Steel	Secondary Water (Ext)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-5	3.4.1.14	D
Heat Exchanger Tube Side (HX # 153)	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-4	3.4.1.16	D
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
Orifice	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A

Table 3.4.2-3 Steam and Power Conversion System – Summary of Aging Management Evaluation – Feedwater 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	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	B
Orifice	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.D1-9	3.4.1.29	B
Piping	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	A
Piping	PB	Carbon Steel	Secondary Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	VIII.D1-7	3.4.1.01	A
Piping	PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	B
Piping	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.D1-9	3.4.1.29	B
Thermowell	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Thermowell	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-4	3.4.1.16	B
Thermowell	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	B
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Tubing	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-4	3.4.1.16	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	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	A
Valve	PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-8	3.4.1.04	B
Valve	PB	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.D1-9	3.4.1.29	B
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Valve	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.D1-4	3.4.1.16	B

Notes for Table 3.4.2-3:

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.

J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

None

Table 3.4.2-4 Steam and Power Conversion System – Summary of Aging Management Evaluation – Condensate 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 preload	Bolting Integrity (B2.1.7)	None	None	H, 1
Closure Bolting	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-1	3.4.1.22	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Piping	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-8	3.4.1.28	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	A
Piping	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	B
Piping	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.E-35	3.4.1.29	B
Rupture Disc	PB	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	None	None	G
Rupture Disc	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-29	3.4.1.16	B
Tank	PB	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	None	None	G
Tank	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-40	3.4.1.06	B

Table 3.4.2-4 Steam and Power Conversion System – Summary of Aging Management Evaluation – Condensate System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	PB	Carbon Steel	Atmosphere/ Weather (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-8	3.4.1.28	A
Valve	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	A
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.E-34	3.4.1.04	B
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.E-35	3.4.1.29	B

Notes for Table 3.4.2-4:

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.

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. NUREG-1801 only addresses loss of preload for bolting of "Steel in Air-Indoor Uncontrolled."

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	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	LBS, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Instrument Bellows	LBS	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Instrument Bellows	LBS	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	B
Instrument Bellows	LBS	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-24	3.4.1.14	B
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
Insulation	INS	Insulation Foamglas	Plant Indoor Air (Ext)	None	None	None	None	J
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	A
Piping	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-25	3.4.1.04	B

Table 3.4.2-5 Steam and Power Conversion System – Summary of Aging Management Evaluation – Steam Generator Blowdown 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	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.F-26	3.4.1.29	B
Pump	LBS	Stainless Steel Cast Austenitic	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Pump	LBS	Stainless Steel Cast Austenitic	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	B
Strainer	SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Strainer	SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-25	3.4.1.04	B
Strainer	SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.F-26	3.4.1.29	B
Tank	SIA	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Tank	SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-25	3.4.1.04	D
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Tubing	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	B
Tubing	PB	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-24	3.4.1.14	B

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

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Valve	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	A
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-25	3.4.1.04	B
Valve	LBS, PB, SIA	Carbon Steel	Secondary Water (Int)	Wall thinning	Flow-Accelerated Corrosion (B2.1.6)	VIII.F-26	3.4.1.29	B
Valve	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Valve	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-23	3.4.1.16	B
Valve	PB	Stainless Steel	Secondary Water (Int)	Cracking	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.F-24	3.4.1.14	B

Notes for Table 3.4.2-5:

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.

J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

None

Table 3.4.2-6 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary 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	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	Bolting Integrity (B2.1.7)	VIII.H-4	3.4.1.22	B
Closure Bolting	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of preload	Bolting Integrity (B2.1.7)	VIII.H-5	3.4.1.22	B
Filter	FIL, PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	B
Filter	FIL, PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Heat Exchanger Shell Side (HX # 154)	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Heat Exchanger Shell Side (HX # 154)	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-38	3.4.1.04	D

Table 3.4.2-6 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary Feedwater 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 Tube Side (HX # 155, 156, 157)	HT, PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-6	3.4.1.12	B
Heat Exchanger Tube Side (HX # 157)	HT, PB	Carbon Steel	Lubricating Oil (Int)	Reduction of heat transfer	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-15	3.4.1.10	B
Heat Exchanger Tube Side	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Heat Exchanger Tube Side	HT, PB	Carbon Steel	Secondary Water (Ext)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-38	3.4.1.04	D
Orifice	PB, TH	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	B
Orifice	PB, TH	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Orifice	PB, TH	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Orifice	PB, TH	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-32	3.4.1.16	B
Piping	PB	Carbon Steel	Buried (Ext)	Loss of material	Buried Piping and Tanks Inspection (B2.1.18)	VIII.G-1	3.4.1.11	A

Table 3.4.2-6 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary Feedwater 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	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Piping	PB	Carbon Steel	Secondary Water (Int)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	VIII.G-37	3.4.1.01	A
Piping	PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-38	3.4.1.04	B
Pump	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	B
Pump	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Pump	PB	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-38	3.4.1.04	B
Spacer Ring	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Spacer Ring	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-32	3.4.1.16	B
Tubing	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	B
Tubing	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A

Table 3.4.2-6 Steam and Power Conversion System – Summary of Aging Management Evaluation – Auxiliary Feedwater System (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Tubing	PB	Stainless Steel	Plant Indoor Air (Ext)	None	None	VIII.I-10	3.4.1.41	A
Tubing	PB	Stainless Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-32	3.4.1.16	B
Turbine	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	D
Turbine	PB	Carbon Steel	Plant Indoor Air (Ext)	Loss of material	External Surfaces Monitoring Program (B2.1.20)	VIII.H-7	3.4.1.28	A
Valve	PB	Carbon Steel	Dry Gas (Int)	None	None	VIII.I-15	3.4.1.44	A
Valve	PB	Carbon Steel	Lubricating Oil (Int)	Loss of material	Lubricating Oil Analysis (B2.1.23) and One-Time Inspection (B2.1.16)	VIII.G-35	3.4.1.07	B
Valve	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	A
Valve	PB, SIA	Carbon Steel	Secondary Water (Int)	Loss of material	Water Chemistry (B2.1.2) and One-Time Inspection (B2.1.16)	VIII.G-38	3.4.1.04	B

Notes to table 3.4.2-6:

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.

Plant Specific Notes:
None

heat from these process pipes, and insulation has been installed to further limit the exposure of the concrete.

3.5.2.2.1.4 Loss of Material due to General, Pitting, and Crevice Corrosion

Corrosion in inaccessible areas of steel containment liner:

The ASME Section XI, Subsection IWE program (B2.1.27) and the 10 CFR 50, Appendix J program (B2.1.30) manage loss of material in the steel containment liner. Inaccessible areas of the containment liner are protected against general, pitting, and crevice corrosion by being embedded in concrete and by a moisture barrier that prevents water from reaching inaccessible areas. The Structures Monitoring Program (B2.1.32) will identify and manage any cracks in the concrete or degradation of the moisture barrier that could potentially provide a pathway for water to reach inaccessible portions of the steel containment liner. Reinforced concrete structures at WCGS were designed, constructed, and inspected in accordance with applicable ACI and ASTM standards, which provide for a good quality, dense, well-cured, and low permeability concrete. Design practices and procedural controls ensured that the concrete was consistent with the recommendations and guidance provided by ACI 201.2R. The mixes were designed with entrained air content between 3% and 6%, and the concrete slumps were controlled throughout the batching, mixing, and placement processes. USAR Section 3.8 discusses the design requirements for each major structure. Procedural controls will ensure that borated water spills are not common, and when detected are cleaned up in a timely manner. Therefore, further evaluation for corrosion in inaccessible areas of the steel containment liner is not required.

3.5.2.2.1.5 Loss of Prestress due to Relaxation, Shrinkage, Creep, and Elevated Temperature

Loss of prestress forces due to relaxation, shrinkage, creep, and elevated temperature for PWR prestressed concrete containments and BWR Mark II prestressed concrete containments is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c). The WCGS containment is a prestressed concrete pressure vessel with ungrouted tendons. Section 4.5 describes the evaluation of this TLAA.

3.5.2.2.1.6 Cumulative Fatigue Damage

Not applicable. WCGS does not have containment penetration sleeves with bellows with dissimilar metal welds.

3.5.2.2.1.7 Cracking due to Stress Corrosion Cracking (SCC)

Not applicable. WCGS has no in-scope stainless steel penetration sleeves, penetration bellows, or dissimilar metal welds subject to stress corrosion cracking, so the applicable NUREG-1801 lines were not used.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.01	Concrete elements: walls, dome, basemat, ring girder, buttresses, containment (as applicable)	Aging of accessible and inaccessible concrete areas due to aggressive chemical attack, and corrosion of embedded steel	ISI (IWL) (B2.1.28) and for inaccessible concrete, an examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant specific program is to be evaluated if environment is aggressive.	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.1.1.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.02	Concrete elements; All	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program (B2.1.32). If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.1.2.
3.5.1.03	Concrete elements: foundation, sub-foundation	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program (B2.1.32). If a de-watering system is relied upon for control of erosion of cement from porous concrete subfoundations, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Not applicable. WCGS has no porous concrete foundations, so the applicable NUREG-1801 lines were not used.
3.5.1.04	Concrete elements: dome, wall, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable)	Reduction of strength and modulus of concrete due to elevated temperature	A plant-specific aging management program is to be evaluated	Yes	Not applicable. WCGS has no dome, wall, basemat, ring girder, buttresses, containment, or annulus concrete exposed to elevated temperatures, so the applicable NUREG-1801 lines were not used.
3.5.1.05					Not applicable - BWR only

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.06	Steel elements: steel liner, liner anchors, integral attachments	Loss of material due to general, pitting and crevice corrosion	ISI (IWE) (B2.1.27), and 10 CFR Part 50, Appendix J (B2.1.30).	Yes, if corrosion is significant for inaccessible areas	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI, Subsection IWE (B2.1.27). See further evaluation in subsection 3.5.2.2.1.4.
3.5.1.07	Prestressed containment tendons	Loss of prestress due to relaxation, shrinkage, creep, and elevated temperature	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Loss of prestress of containment tendons is a TLAA. See further evaluation in subsection 3.5.2.2.1.5.
3.5.1.08					Not applicable - BWR only

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.09	Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomers	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	Not applicable. There are no containment penetrations for which a bellows or expansion joint is part of the containment pressure boundary at WCGS. So the applicable NUREG-1801 lines were not used. However there are containment penetrations without bellows or expansion joints as part of the containment pressure boundary. Of them, only the main steam penetration design is supported by a cyclic load evaluation TLAA, described in Section 4.6.2. See the further evaluation in subsection 3.5.2.2.1.6.
3.5.1.10	Stainless steel penetration sleeves, penetration bellows, dissimilar metal welds	Cracking due to stress corrosion cracking	ISI (IWE) (B2.1.27), and 10 CFR Part 50, Appendix J (B2.1.30), and additional appropriate examinations/evaluations for bellows assemblies and dissimilar metal welds.	Yes	Not applicable. WCGS has no in-scope stainless steel penetration sleeves, penetration bellows, or dissimilar metal welds subject to stress corrosion cracking, so the applicable NUREG-1801 lines were not used.
3.5.1.11					Not applicable - BWR only
3.5.1.12	Steel, stainless steel elements, dissimilar metal welds: penetration sleeves, penetration bellows; suppression pool shell, unbraced downcomers	Cracking due to cyclic loading	ISI (IWE) (B2.1.27), and 10 CFR Part 50, Appendix J (B2.1.30), and supplemented to detect fine cracks	Yes	CLB fatigue analysis does exist. See 3.5.1.09.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.13					Not applicable - BWR only
3.5.1.14	Concrete elements: dome, wall, basemat ring girder, buttresses, containment (as applicable)	Loss of material (Scaling, cracking, and spalling) due to freeze-thaw	ISI (IWL) (B2.1.28). Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557).	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.1.9.
3.5.1.15	Concrete elements: walls, dome, basemat, ring girder, buttresses, containment, concrete fill-in annulus (as applicable).	Cracking due to expansion and reaction with aggregate; increase in porosity, permeability due to leaching of calcium hydroxide	ISI (IWL) (B2.1.28) for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R.	Yes, if concrete was not constructed as stated for inaccessible areas	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.1.10.
3.5.1.16	Seals, gaskets, and moisture barriers	Loss of sealing and leakage through containment due to deterioration of joint seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	ISI (IWE) (B2.1.27), and 10 CFR Part 50, Appendix J (B2.1.30).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI, Subsection IWE (B2.1.27).
3.5.1.17	Personnel airlock, equipment hatch and CRD hatch locks, hinges, and closure mechanisms	Loss of leak tightness in closed position due to mechanical wear of locks, hinges and closure mechanisms	10 CFR Part 50, Appendix J (B2.1.30) and Plant Technical Specifications	No	Consistent with NUREG-1801.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.18	Steel penetration sleeves and dissimilar metal welds; personnel airlock, equipment hatch and CRD hatch	Loss of material due to general, pitting, and crevice corrosion	ISI (IWE) (B2.1.27), and 10 CFR Part 50, Appendix J (B2.1.30).	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI, Subsection IWE (B2.1.27).
3.5.1.19					Not applicable - BWR only
3.5.1.20					Not applicable - BWR only
3.5.1.21					Not applicable - BWR only
3.5.1.22	Prestressed containment: tendons and anchorage components	Loss of material due to corrosion	ISI (IWL) (B2.1.28)	No	Consistent with NUREG-1801.
3.5.1.23	All Groups except Group 6: interior and above grade exterior concrete	Cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.1.
3.5.1.24	All Groups except Group 6: interior and above grade exterior concrete	Increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.1.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.25	All Groups except Group 6: steel components: all structural steel	Loss of material due to corrosion	Structures Monitoring Program (B2.1.32). If protective coatings are relied upon to manage the effects of aging, the structures monitoring program is to include provisions to address protective coating monitoring and maintenance.	Yes, if not within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.1.
3.5.1.26	All Groups except Group 6: accessible and inaccessible concrete: foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Structures Monitoring Program (B2.1.32). Evaluation is needed for plants that are located in moderate to severe weathering conditions (weathering index >100 day-inch/yr) (NUREG-1557).	Yes, if not within the scope of the applicant's structures monitoring program or for inaccessible areas of plants located in moderate to severe weathering conditions	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.1.
3.5.1.27	All Groups except Group 6: accessible and inaccessible interior/exterior concrete	Cracking due to expansion due to reaction with aggregates	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program or concrete was not constructed as stated for inaccessible areas	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.1.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.28	Groups 1-3, 5-9: All	Cracks and distortion due to increased stress levels from settlement	Structures Monitoring Program (B2.1.32). If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	See further evaluation in subsection 3.5.2.2.2.1. ESW Discharge Structure is inspected per Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33).
3.5.1.29	Groups 1-3, 5-9: foundation	Reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation	Structures Monitoring Program (B2.1.32). If a de-watering system is relied upon for control of settlement, then the licensee is to ensure proper functioning of the de-watering system through the period of extended operation.	Yes, if not within the scope of the applicant's structures monitoring program or a de-watering system is relied upon	Not applicable. WCGS has no porous concrete foundations, so the applicable NUREG-1801 lines were not used.
3.5.1.30	Group 4: Radial beam seats in BWR drywell; RPV support shoes for PWR with nozzle supports; Steam generator supports	Lock-up due to wear	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of ISI or structures monitoring program	Not applicable. WCGS did not use Lubrite on the RPV support shoes or steam generator supports, so the applicable NUREG-1801 line was not used.
3.5.1.31	Groups 1-3, 5, 7-9: below-grade concrete components, such as exterior walls below grade and foundation	Increase in porosity and permeability, cracking, loss of material (spalling, scaling)/ aggressive chemical attack;	Structures Monitoring Program (B2.1.32); Examination of representative samples of below-grade concrete, and periodic monitoring of groundwater, if the environment is non-aggressive. A plant specific program is to be evaluated if environment is aggressive.	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.2.4.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.32	Groups 1-3, 5, 7-9: exterior above and below grade reinforced concrete foundations	Increase in porosity and permeability, and loss of strength due to leaching of calcium hydroxide	Structures Monitoring Program (B2.1.32) for accessible areas. None for inaccessible areas if concrete was constructed in accordance with the recommendations in ACI 201.2R-77.	Yes, if concrete was not constructed as stated for inaccessible areas	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.2.5.
3.5.1.33	Groups 1-5: concrete	Reduction of strength and modulus of concrete due to elevated temperature	A plant-specific aging management program is to be evaluated	Yes	Consistent with NUREG-1801. The plant-specific aging management program(s) used to manage the aging include: Structures Monitoring Program (B2.1.32). See further evaluation in subsection 3.5.2.2.2.3.
3.5.1.34	Group 6: Concrete; all	Increase in porosity and permeability, cracking, loss of material due to aggressive chemical attack; cracking, loss of bond, loss of material due to corrosion of embedded steel	Inspection of Water-Control Structures (B2.1.33)	Yes	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.4.1.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.35	Group 6: exterior above and below grade concrete foundation	Loss of material (spalling, scaling) and cracking due to freeze-thaw	Inspection of Water-Control Structures (B2.1.33)	Yes, for inaccessible areas of plants located in moderate to severe weathering conditions	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.4.2.
3.5.1.36	Group 6: all accessible/ inaccessible reinforced concrete	Cracking due to expansion/ reaction with aggregates	Inspection of Water-Control Structures (B2.1.33)	Yes, if concrete was not constructed as stated for inaccessible areas	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.4.3.
3.5.1.37	Group 6: exterior above and below grade reinforced concrete foundation interior slab	Increase in porosity and permeability, loss of strength due to leaching of calcium hydroxide	Inspection of Water-Control Structures (B2.1.33)	Yes, if concrete was not constructed as stated for inaccessible areas	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.4.3.
3.5.1.38	Groups 7, 8: Tank liners	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated	Yes	Not applicable. WCGS has no in-scope stainless steel tank liners exposed to water-standing so the applicable NUREG-1801 lines were not used.
3.5.1.39	Support members; welds; bolted connections; support anchorage to building structure	Loss of material due to general and pitting corrosion	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.6.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.40	Building concrete at locations of expansion and grouted anchors; grout pads for support base plates	Reduction in concrete anchor capacity due to local concrete degradation/ service-induced cracking or other concrete aging mechanisms	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program	Consistent with NUREG-1801. See further evaluation in subsection 3.5.2.2.2.6.
3.5.1.41	Vibration isolation elements	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	Structures Monitoring Program (B2.1.32)	Yes, if not within the scope of the applicant's structures monitoring program	Not applicable. WCGS has no in-scope vibration isolation elements, so the applicable NUREG-1801 lines were not used.
3.5.1.42	Groups B1.1, B1.2, and B1.3: support members: anchor bolts, welds	Cumulative fatigue damage (CLB fatigue analysis exists)	TLAA, evaluated in accordance with 10 CFR 54.21(c)	Yes, TLAA	For fluid system and component supports at WCGS, only a time-dependent analysis of reactor vessel supports for heatup operational events is a TLAA. See Section 4.3.2.9 and the further evaluation in subsection 3.5.2.2.2.7.
3.5.1.43	Groups 1-3, 5, 6: all masonry block walls	Cracking due to restraint shrinkage, creep, and aggressive environment	Masonry Wall Program (B2.1.31)	No	NUREG-1801 does not provide a line in which concrete masonry is inspected per the Fire Protection program. Therefore, for concrete masonry walls that provide a fire barrier function, the Fire Protection program (B2.1.12) has been added.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.44	Group 6 elastomer seals, gaskets, and moisture barriers	Loss of sealing due to deterioration of seals, gaskets, and moisture barriers (caulking, flashing, and other sealants)	Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801.
3.5.1.45	Group 6: exterior above and below grade concrete foundation; interior slab	Loss of material due to abrasion, cavitation	Inspection of Water-Control Structures (B2.1.33)	No	Consistent with NUREG-1801.
3.5.1.46	Group 5: Fuel pool liners	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	Water Chemistry B2.1.2) and monitoring of spent fuel pool water level in accordance with technical specifications and leakage from the leak chase channels.	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Water Chemistry (B2.1.2).
3.5.1.47	Group 6: all metal structural members	Loss of material due to general (steel only), pitting and crevice corrosion	Inspection of Water-Control Structures (B2.1.33)	No	Consistent with NUREG-1801 for material, environment, and aging effect, but a different aging management program Structures Monitoring Program (B2.1.32) is credited.
3.5.1.48	Group 6: earthen water control structures - dams, embankments, reservoirs, channels, canals, and ponds	Loss of material, loss of form due to erosion, settlement, sedimentation, frost action, waves, currents, surface runoff, Seepage	Inspection of Water-Control Structures (B2.1.33)	No	Consistent with NUREG-1801.
3.5.1.49					Not applicable - BWR only

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.50	Groups B2, and B4: galvanized steel, aluminum, stainless steel support members; welds; bolted connections; support anchorage to building structure	Loss of material due to pitting and crevice corrosion	Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801.
3.5.1.51	Group B1.1: high strength low-alloy bolts	Cracking due to stress corrosion cracking; loss of material due to general corrosion	Bolting Integrity (B2.1.7)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: Bolting Integrity (B2.1.7).
3.5.1.52	Groups B2, and B4: sliding support bearings and sliding support surfaces	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	Structures Monitoring Program (B2.1.32)	No	Consistent with NUREG-1801. This item covers piping supports (Group B2). There are no equipment supports (Group B4) with sliding surfaces at WCGS.
3.5.1.53	Groups B1.1, B1.2, and B1.3: support members: welds; bolted connections; support anchorage to building structure	Loss of material due to general and pitting corrosion	ISI (IWF) (B2.1.29)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI, Subsection IWF (B2.1.29).

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.54	Groups B1.1, B1.2, and B1.3: Constant and variable load spring hangers; guides; stops;	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF) (B2.1.29)	No	Consistent with NUREG-1801 with aging management program exceptions. The aging management program(s) with exceptions to NUREG-1801 include: ASME Section XI, Subsection IWF (B2.1.29).
3.5.1.55	Steel, galvanized steel, and aluminum support members; welds; bolted connections; support anchorage to building structure	Loss of material due to boric acid corrosion	Boric Acid Corrosion (B2.1.4)	No	Consistent with NUREG-1801.
3.5.1.56	Groups B1.1, B1.2, and B1.3: Sliding surfaces	Loss of mechanical function due to corrosion, distortion, dirt, overload, fatigue due to vibratory and cyclic thermal loads	ISI (IWF) (B2.1.29)	No	Not applicable. WCGS has no in-scope Group B1 sliding surfaces utilizing Lubrite, so the applicable NUREG-1801 lines were not used.
3.5.1.57	Groups B1.1, B1.2, and B1.3: Vibration isolation elements	Reduction or loss of isolation function/ radiation hardening, temperature, humidity, sustained vibratory loading	ISI (IWF) (B2.1.29)	No	Not applicable. WCGS has no in-scope vibration isolation elements, so the applicable NUREG-1801 lines were not used.
3.5.1.58	Galvanized steel and aluminum support members; welds; bolted connections; support anchorage to building structure exposed to air - indoor uncontrolled	None	None	No	Consistent with NUREG-1801.

Table 3.5.1 Summary of Aging Management Evaluations in Chapters II and III of NUREG-1801 for Containments, Structures, and Component Supports (Continued)

Item Number	Component Type	Aging Effect / Mechanism	Aging Management Program	Further Evaluation Recommended	Discussion
3.5.1.59	Stainless steel support members; welds; bolted connections; support anchorage to building structure	None	None	No	Consistent with NUREG-1801.

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Caulking/ Sealant	SH	Elastomer	Plant Indoor Air (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Compressible Joints/Seals	ES, SH	Elastomer	Atmosphere/ Weather (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Compressible Joints/Seals	SH, SPB	Elastomer	Plant Indoor Air (Structural) (Ext)	Loss of sealing; Leakage through containment	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A3-7	3.5.1.16	B
Compressible Joints/Seals	ES	Elastomer	Plant Indoor Air (Structural) (Ext)	Loss of sealing	Structures Monitoring Program (B2.1.32)	III.A6-12	3.5.1.44	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Loss of material (spalling, scaling) and cracking	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-2	3.5.1.14	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking due to expansion	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-3	3.5.1.15	A

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-4	3.5.1.01	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracks and distortion	Structures Monitoring Program (B2.1.32)	II.A1-5	3.5.1.02	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Increase in porosity, permeability	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-6	3.5.1.15	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking, loss of bond, and loss of material (spalling, scaling)	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-7	3.5.1.01	A
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Concrete cracking and spalling	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	VII.G-30	3.3.1.66	B
Concrete Elements	FB, MB, SPB, SS	Concrete	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	VII.G-31	3.3.1.67	B
Concrete Elements	FLB, SH, SLD, SPB, SS	Concrete	Buried (Structural) (Ext)	Loss of material (spalling, scaling) and cracking	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-2	3.5.1.14	A
Concrete Elements	FLB, SH, SLD, SPB, SS	Concrete	Buried (Structural) (Ext)	Cracking due to expansion	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-3	3.5.1.15	A

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	FLB, SH, SLD, SPB, SS	Concrete	Buried (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-4	3.5.1.01	A
Concrete Elements	FLB, SH, SLD, SPB, SS	Concrete	Buried (Structural) (Ext)	Cracks and distortion	Structures Monitoring Program (B2.1.32)	II.A1-5	3.5.1.02	A
Concrete Elements	FLB, SH, SLD, SPB, SS	Concrete	Buried (Structural) (Ext)	Increase in porosity, permeability	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-6	3.5.1.15	A
Concrete Elements	FB, HLBS, MB, PWR, SH, SLD, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking due to expansion	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-3	3.5.1.15	A
Concrete Elements	SH, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-4	3.5.1.01	A
Concrete Elements	FB, HLBS, MB, PWR, SH, SLD, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracks and distortion	Structures Monitoring Program (B2.1.32)	II.A1-5	3.5.1.02	A

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	FB, HLBS, MB, PWR, SH, SLD, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking, loss of bond, and loss of material (spalling, scaling)	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-7	3.5.1.01	A
Concrete Elements	FB, HLBS, MB, PWR, SLD, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction of strength and modulus	Structures Monitoring Program (B2.1.32)	III.A4-1	3.5.1.33	E, 3
Concrete Elements	FB, HLBS, MB, PWR, SLD, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Concrete cracking and spalling	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	VII.G-28	3.3.1.65	B
Concrete Elements	FB, HLBS, MB, PWR, SLD, SPB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Loss of material	Fire Protection (B2.1.12) and Structures Monitoring Program (B2.1.32)	VII.G-29	3.3.1.67	B
Fire Barrier Coatings/ Wraps	FB	Fire Barrier (Ceramic Fiber)	Plant Indoor Air (Structural) (Ext)	Loss of material, cracking	Fire Protection (B2.1.12	None	None	J, 2
Fire Barrier Doors	FB, SH	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Fire Protection (B2.1.12)	VII.G-3	3.3.1.63	B
Fire Barrier Seals	FB, SH	Elastomer	Plant Indoor Air (Structural) (Ext)	Increased hardness, shrinkage and loss of strength	Fire Protection (B2.1.12)	VII.G-1	3.3.1.61	B
Hatch	FB, SH, SPB, SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of leak tightness	10 CFR Part 50, Appendix J (B2.1.30)	II.A3-5	3.5.1.17	A

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Hatch	FB, SH, SPB, SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A3-6	3.5.1.18	B
Hatch	FB, SH, SPB, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of leak tightness	10 CFR Part 50, Appendix J (B2.1.30)	II.A3-5	3.5.1.17	A
Hatch	FB, SH, SPB, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A3-6	3.5.1.18	B
Hatch	MB, SLD	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking due to expansion	Structures Monitoring Program (B2.1.32)	III.A7-1	3.5.1.27	A
Hatch	MB, SLD	Concrete	Atmosphere/ Weather (Structural) (Ext)	Loss of material (spalling, scaling) and cracking	Structures Monitoring Program (B2.1.32)	III.A7-5	3.5.1.26	A
Hatch	MB, SLD	Concrete	Atmosphere/ Weather (Structural) (Ext)	Cracking, loss of bond, and loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A7-8	3.5.1.23	A
Hatch	MB, SLD	Concrete	Atmosphere/ Weather (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	Structures Monitoring Program (B2.1.32)	III.A7-9	3.5.1.24	A
Hatch	FB, SH, SPB, SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Fire Protection (B2.1.12)	VII.G-4	3.3.1.63	D

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Hatch	FB, SH, SPB, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Fire Protection (B2.1.12)	VII.G-3	3.3.1.63	D
Hatches/Plugs	MB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking due to expansion	Structures Monitoring Program (B2.1.32)	III.A4-2	3.5.1.27	A
Hatches/Plugs	MB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	Structures Monitoring Program (B2.1.32)	III.A4-4	3.5.1.24	A
Hatches/Plugs	MB, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Cracking, loss of bond, and loss of material (spalling, scaling)	Structures Monitoring Program (B2.1.32)	III.A4-3	3.5.1.23	A
Liner Containment	SH, SLD, SPB	Carbon Steel	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Liner Containment	SH, SLD, SPB	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A1-11	3.5.1.06	B
Liner Refueling	SH	Stainless Steel	Encased in Concrete (Ext)	None	None	VII.J-17	3.3.1.96	C
Liner Refueling	SH	Stainless Steel	Plant Indoor Air (Structural) (Ext)	None	None	VII.J-15	3.3.1.94	C
Liner Refueling	SH	Stainless Steel	Submerged (Structural) (Ext)	Cracking	Water Chemistry (B2.1.2) and Monitoring of the Spent Fuel Pool Water Level	III.A5-13	3.5.1.46	B

Table 3.5.2-1 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Reactor Building (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Penetration	PB	Carbon Steel	Plant Indoor Air (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	None	None	H, 1
Penetration	FLB, SPB, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A3-1	3.5.1.18	B
Penetrations Electrical	FLB, SPB, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWE (B2.1.27) and 10 CFR Part 50, Appendix J (B2.1.30)	II.A3-1	3.5.1.18	B
Pipe Whip Restraints & Jet Shields	HLBS, MB, PWR, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A4-5	3.5.1.25	A
Stairs/ Platforms/ Grates	NSRS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A4-5	3.5.1.25	A
Structural Steel (Tendons and Anchorage Components)	SS	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWL (B2.1.28)	II.A1-10	3.5.1.22	A
Structural Steel	SS	Carbon Steel	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Structural Steel	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A4-5	3.5.1.25	A
Tendons	SPB	Carbon Steel	Atmosphere/ Weather (Structural) (Ext)	Loss of prestress	Time Limited Aging Analysis evaluated for the period of extended operation.	II.A1-9	3.5.1.07	A

Notes for Table 3.5.2-1:

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.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

H Aging effect not in NUREG-1801 for this component, material and environment combination.

J Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1 The cyclic load evaluation of the main steam penetrations is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c)(1). Section 4.6.2 describes the evaluation of this TLAA for the cyclic load evaluation of the main steam penetrations.

2 NUREG-1801 does not provide a line in which Fire Barriers (Ceramic Fiber or Cementitious Coating) are inspected per the Fire Protection program (B2.1.12).

3 Concrete is monitored for visible signs of aging effects due to increased temperature by Structures Monitoring Program (B2.1.32).

Notes for Table 3.5.2-12:

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.
C	Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.
J	Neither the component nor the material and environment combination is evaluated in NUREG-1801.

Plant Specific Notes:

1	Fatigue design of the spent fuel pool liner for seismic events is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c)(1). Section 4.3.6 describes the evaluation of this TLAA for the fatigue design of the spent fuel racks.
2	NUREG-1801 does not provide a line in which Fire Barriers (Ceramic Fiber or Cementitious Coating) are inspected per the Fire Protection program (B2.1.12).
3	Fuel storage pool leak chase standpipes utilize base-mounted pressure transmitters to monitor standpipe water levels. (Reference USAR Section 9.3.3.2.3)

Table 3.5.2-16 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Essential Service Water System Discharge Structure

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Cracking due to expansion	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-2	3.5.1.36	A
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Increase in porosity and permeability, cracking, loss of material (spalling, scaling	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-3	3.5.1.34	A
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Cracks and distortion	Structures Monitoring Program (B2.1.32)	III.A6-4	3.5.1.28	A
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Loss of material (spalling, scaling) and cracking	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-5	3.5.1.35	A

Table 3.5.2-16 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Essential Service Water System Discharge Structure (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Increase in porosity and permeability, loss of strength	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-6	3.5.1.37	A
Concrete Elements	SH, SS	Concrete	Buried (Structural) (Ext)	Loss of material	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-7	3.5.1.45	A
Concrete Elements	DF, SH, SS	Concrete	Submerged (Structural) (Ext)	Increase in porosity and permeability, loss of strength	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-6	3.5.1.37	A
Concrete Elements	DF, SH, SS	Concrete	Submerged (Structural) (Ext)	Loss of material	Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33)	III.A6-7	3.5.1.45	A
Penetrations Mechanical	SH, SS	Carbon Steel (Galvanized or Coated)	Encased in Concrete (Ext)	None	None	VII.J-21	3.3.1.96	C
Penetrations Mechanical	SH, SS	Carbon Steel (Galvanized or Coated)	Submerged (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.A6-11	3.5.1.47	E, 2

Notes for Table 3.5.2-16:

Standard Notes:

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with 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.

Plant Specific Notes:

1 Not Used.

2 NUREG 1801 line III.A6-11 specifies Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33) as the aging management program for metal components in water-control structures. Regulatory Guide 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Plants (B2.1.33) does not address metal components, so the Structures Monitoring Program (B2.1.32) is used.

Table 3.5.2-22 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation - Supports

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Cable Trays & Supports	NSRS	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-7	3.5.1.50	A
Cable Trays & Supports	NSRS, SS	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-5	3.5.1.58	A
Cable Trays & Supports	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B2-1	3.5.1.40	A
Conduit And Supports	NSRS, SH	Aluminum	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-7	3.5.1.50	A
Conduit And Supports	NSRS, SH, SS	Aluminum	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-4	3.5.1.58	A
Conduit And Supports	NSRS, SH	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-7	3.5.1.50	A
Conduit And Supports	NSRS, SH, SS	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-5	3.5.1.58	A
Conduit And Supports	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B2-1	3.5.1.40	A

Table 3.5.2-22 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Electrical Panels & Enclosures	NSRS, SH	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B3-7	3.5.1.39	A
Electrical Panels & Enclosures	NSRS, SH, SS	Carbon Steel (Galvanized or Coated)	Plant Indoor Air (Structural) (Ext)	None	None	III.B3-3	3.5.1.58	A
Electrical Panels & Enclosures	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B3-1	3.5.1.40	A
High Strength Bolting	SS	High Strength Low Alloy Steel (Bolting)	Plant Indoor Air (Structural) (Ext)	Cracking	Bolting Integrity (B2.1.7)	III.B1.1-3	3.5.1.51	B, 2
Spring Hangers	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of mechanical function	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.1-2	3.5.1.54	B
Spring Hangers	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of mechanical function	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.2-2	3.5.1.54	B
Support Fittings IE Cable Tray	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	None	None	H, 3
Supports ASME 1	SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B1.1-14	3.5.1.55	A
Supports ASME 1	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	III.B1.1-12	3.5.1.42	A, 5

Table 3.5.2-22 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Supports ASME 1	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.1-13	3.5.1.53	B
Supports ASME 1	SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B1.1-1	3.5.1.40	A
Supports ASME 1	SS	Graphitic Tool Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B1.1-14	3.5.1.55	A
Supports ASME 1	SS	Stainless Steel	Borated Water Leakage (Ext)	None	None	III.B1.1-10	3.5.1.59	A
Supports ASME 2 & 3	SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B1.2-11	3.5.1.55	A
Supports ASME 2 & 3	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of mechanical function	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.2-2	3.5.1.54	B
Supports ASME 2 & 3	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Cumulative fatigue damage	Time Limited Aging Analysis evaluated for the period of extended operation.	III.B1.2-9	3.5.1.42	I, 4
Supports ASME 2 & 3	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.2-10	3.5.1.53	B
Supports ASME 2 & 3	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B1.2-1	3.5.1.40	A
Supports ASME 2 & 3	SS	Stainless Steel	Borated Water Leakage (Ext)	None	None	III.B1.2-8	3.5.1.59	A
Supports ASME 2 & 3	SS	Stainless Steel	Plant Indoor Air (Structural) (Ext)	None	None	III.B1.2-7	3.5.1.59	A
Supports HVAC Duct	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-10	3.5.1.39	A

Table 3.5.2-22 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Supports HVAC Duct	SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B2-1	3.5.1.40	A
Supports Instrument	NSRS, SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B2-11	3.5.1.55	A
Supports Instrument	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-10	3.5.1.39	A
Supports Instrument	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B2-1	3.5.1.40	A
Supports Insulation	NSRS	Aluminum	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-4	3.5.1.58	A
Supports Insulation	NSRS	Stainless Steel	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-8	3.5.1.59	A
Supports Mech Equip Class 1	SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B1.1-14	3.5.1.55	A
Supports Mech Equip Class 1	SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.1-13	3.5.1.53	B
Supports Mech Equip Class 1	SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B1.1-1	3.5.1.40	A
Supports Mech Equip Class 2 & 3	SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B1.2-11	3.5.1.55	A
Supports Mech Equip Class 2 & 3	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of mechanical function	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.2-2	3.5.1.54	B
Supports Mech Equip Class 2 & 3	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	III.B1.2-10	3.5.1.53	B

Table 3.5.2-22 Containments, Structures, and Component Supports – Summary of Aging Management Evaluation – Supports (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Supports Mech Equip Class 2 & 3	SS	Carbon Steel	Raw Water (Ext)	Loss of material	ASME Section XI, Subsection IWF (B2.1.29)	None	None	H, 1
Supports Mech Equip Class 2 & 3	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B1.2-1	3.5.1.40	A
Supports Mech Equip Non ASME	NSRS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B4-11	3.5.1.55	A
Supports Mech Equip Non ASME	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B4-10	3.5.1.39	A
Supports Mech Equip Non ASME	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B4-1	3.5.1.40	A
Supports Mech Equip Non ASME	NSRS	Stainless Steel	Plant Indoor Air (Structural) (Ext)	None	None	III.B4-8	3.5.1.59	A
Supports Non ASME	NSRS, SS	Carbon Steel	Borated Water Leakage (Ext)	Loss of material	Boric Acid Corrosion (B2.1.4)	III.B2-11	3.5.1.55	A
Supports Non ASME	NSRS, SS	Carbon Steel	Plant Indoor Air (Structural) (Ext)	Loss of material	Structures Monitoring Program (B2.1.32)	III.B2-10	3.5.1.39	A
Supports Non ASME	NSRS, SS	Concrete	Plant Indoor Air (Structural) (Ext)	Reduction in concrete anchor capacity	Structures Monitoring Program (B2.1.32)	III.B2-1	3.5.1.40	A
Supports Non ASME	ES, SS	Lubrite®	Plant Indoor Air (Structural) (Ext)	Loss of mechanical function	Structures Monitoring Program (B2.1.32)	III.B2-2	3.5.1.52	A
Supports Non ASME	NSRS	Stainless Steel	Borated Water Leakage (Ext)	None	None	III.B2-9	3.5.1.59	A
Supports Non ASME	NSRS	Stainless Steel	Plant Indoor Air (Structural) (Ext)	None	None	III.B2-8	3.5.1.59	A

Notes for Table 3.5.2-22:

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.
H	Aging effect not in NUREG-1801 for this component, material and environment combination.
I	Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

Plant Specific Notes:

1	This non-NUREG-1801 line was created because NUREG-1801 does not address carbon steel supports in raw water. The aging effects listed are the same as those listed in the Open-Cycle Cooling Water Section of NUREG-1801. Therefore the aging management program was chosen separately as this particular component is consistently under water and other aging management programs would not apply.
2	High strength bolting with an actual yield strength of greater than 150 ksi may be susceptible to stress corrosion cracking (SCC) if subjected to excessive bolt preload and contaminants, such as molybdenum sulfide in the thread lubricants. At WCGS, the maximum ultimate tensile strength for bolts was limited to 170 ksi. Of the bolting materials specified, only SA-540 Grade 21 has a specified minimum yield of equal to or greater than 150 ksi. Bolt preload was managed by procedural controls, and lubricants containing detrimental contaminants were not used. A review of plant operating experience has not found any instances of SCC. Therefore, cracking due to SCC is not an aging effect requiring management for high strength bolting at WCGS.
3	Fatigue design of Class 1E electrical raceway supports is a TLAA as defined in 10 CFR 54.3. TLAAs are evaluated in accordance with 10 CFR 54.21(c)(1). Section 4.3.7 describes the evaluation of this TLAA for the fatigue of Class 1E electrical raceway supports.
4	ASME Class 2 and 3 rules used for WCGS Class 2 and 3 piping and components require no fatigue or cycle design analysis for their supports, and no other similar analyses exist for supports for these components at WCGS.
5	For fluid system and component supports at WCGS, only a time-dependent analysis of reactor vessel supports for heatup operational events is a TLAA. Section 4.3.2.9 describes the evaluation of this TLAA.

3.6.2.1 Materials, Environment, Aging Effects Requiring Management and Aging Management Programs

The materials from which the component types are fabricated, the environments to which they are exposed, the potential aging effects requiring management, and the aging management programs used to manage these aging effects are provided for each of the above electrical component commodities in the following subsections.

3.6.2.1.1 Cable Connections (Metallic Parts)

Materials

The materials of construction for the cable connections (metallic parts) are:

- Various Metals Used For Electrical Contacts

Environment

The cable connections (metallic parts) are exposed to the following environment:

- Atmosphere/Weather

Aging Effects Requiring Management

The following cable connections (metallic parts) aging effect requires management:

- Loosening of bolted connections

Aging Management Programs

The following aging management program manages the aging effects for the cable connections (metallic parts):

- Electrical Connections Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.36)

3.6.2.1.2 Connectors

Materials

The materials of construction for the connector contacts are:

- Various Metals Used For Electrical Contacts

Environment

The connector contacts are exposed to the following environment:

- Borated Water Leakage

tension a conductor must be designed to withstand under heavy load requirements, which includes consideration of ice, wind, and temperature

At WCGS the ACSR transmission conductors with a core of 7 steel strands have ultimate conductor strength of 42,200 lbs. The WCGS ACSR transmission conductors within the scope of License Renewal are installed so that conductor tension does not exceed 9,900 lbs at the NESC heavy loading condition (23% of the ultimate conductor strength).

Tests performed by Ontario Hydroelectric on ACSR transmission conductors with a core of 7 steel strands averaging 70 to 80 years old showed a 30% loss of ultimate conductor strength due to corrosion. Assuming a 30% loss of ultimate conductor strength (12,660 lbs) due to corrosion over 60 years the WCGS ACSR transmission conductors have adequate design margin to offset the loss of strength due to corrosion and still meet the NESC requirement of not exceeding 60% of the ultimate conductor strength ((42,200- 12660)(0.60) = 17,724 lbs). The Ontario Hydroelectric test envelopes the conductors at WCGS, and based on the conservatism in strength margin, demonstrates that the material loss on the WCGS ACSR transmission conductors is acceptable for the period of extended operation. Therefore, corrosion is not a credible aging effect that requires management for the period of extended operation.

Transmission conductor connections at the time of installation are treated with corrosion inhibitors to avoid connection oxidation and torqued to avoid loss of pre-load. Based on temperature data in the USAR Chapter 2.3, the transmission connections do not experience thermal cycling. The transmission connections are subject to average monthly temperatures ranging from 80 °F in July and August to 29 °F in January with minimal ohmic heating. Therefore, increased resistance of connections due to oxidation or loss of pre-load is not an aging effect requiring management for the period of extended operation.

The WCGS outdoor environment is not subject to industry air pollution or saline environment. Aluminum bus material, galvanized steel support hardware and stainless steel connection material do not experience any appreciable aging effects in this environment. These connections are periodically evaluated via thermography as part of the preventive maintenance activities performed on the startup transformer and disconnect. The periodic thermography will continue into the period of extended operation.

3.6.2.2.4 Quality Assurance for Aging Management of Nonsafety-Related Components

Quality Assurance Program and Administrative Controls are discussed in Section B1.3.

Table 3.6.2-1 – Electrical and Instrument and Controls – Summary of Aging Management Evaluation – Electrical Components

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
10 CFR 50.49 Electrical Equipment	EC, IN	Various Organic Polymers and Metallic Materials	Adverse Localized Environment (Ext)	Various degradation	Time Limited Aging Analysis evaluated for the period of extended operation.	VI.B-1	3.6.1.01	A
Cable Connections (Metallic Parts)	EC	Various Metals Used for Electrical Contacts	Atmosphere/ Weather (Ext)	Loosening of bolted connections	Electrical Connections Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.36)	VI.A-1	3.6.1.13	A
Connector	EC	Various Metals Used for Electrical Contacts	Borated Water Leakage (Ext)	Corrosion of connector contact surfaces	Boric Acid Corrosion (B2.1.4)	VI.A-5	3.6.1.05	A
High Voltage Insulator	NSRS	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Ext)	None	None	VI.A-9	3.6.1.11	I, 1
High Voltage Insulator	NSRS	Carbon Steel (Galvanized or Coated)	Atmosphere/ Weather (Ext)	None	None	VI.A-10	3.6.1.11	I, 1
High Voltage Insulator	IN	Cement (Electrical Insulators)	Atmosphere/ Weather (Ext)	None	None	VI.A-9	3.6.1.11	I, 1
High Voltage Insulator	IN	Cement (Electrical Insulators)	Atmosphere/ Weather (Ext)	None	None	VI.A-10	3.6.1.11	I, 1
High Voltage Insulator	IN	Porcelain	Atmosphere/ Weather (Ext)	None	None	VI.A-9	3.6.1.11	I, 1

Table 3.6.2-1 – Electrical and Instrument and Controls – Summary of Aging Management Evaluation – Electrical Components (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
High Voltage Insulator	IN	Porcelain	Atmosphere/ Weather (Ext)	None	None	VI.A-10	3.6.1.11	I, 1
Insulated Cable & Connections	EC, IN	Various Organic Polymers	Adverse Localized Environment (Ext)	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.24)	VI.A-2	3.6.1.02	A
Insulated Cable & Connections	EC, IN	Various Organic Polymers	Adverse Localized Environment (Ext)	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Used in Instrumentation Circuits (B2.1.25)	VI.A-3	3.6.1.03	A
Insulated Cable & Connections	EC, IN	Various Organic Polymers	Adverse Localized Environment (Ext)	Localized damage and breakdown of insulation leading to electrical failure	Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.26)	VI.A-4	3.6.1.04	A

Table 3.6.2-1 – Electrical and Instrument and Controls – Summary of Aging Management Evaluation – Electrical Components (Continued)

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Vol. 2 Item	Table 1 Item	Notes
Penetrations Electrical	EC, IN	Various Organic Polymers	Adverse Localized Environment (Ext)	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.24)	VI.A-2	3.6.1.02	C
Switchyard Bus and Connections	EC	Aluminum	Atmosphere/ Weather (Ext)	None	None	VI.A-15	3.6.1.12	I, 2
Switchyard Bus and Connections	EC	Stainless Steel	Atmosphere/ Weather (Ext)	None	None	VI.A-15	3.6.1.12	I, 2
Terminal Block	IN	Various Insulation Material (Electrical)	Adverse Localized Environment (Ext)	Embrittlement, cracking, melting, discoloration, swelling, or loss of dielectric strength leading to reduced insulation resistance (IR); electrical failure	Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements (B2.1.24)	VI.A-6	3.6.1.02	C
Transmission Conductors and Connections	EC	Aluminum Conductor Steel Reinforced	Atmosphere/ Weather (Ext)	None	None	VI.A-16	3.6.1.12	I, 2

Notes for Table 3.6.2-1:

Standard Notes:

A Consistent with NUREG-1801 item for component, material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

C Component is different, but consistent with NUREG-1801 item for material, environment, and aging effect. AMP is consistent with NUREG-1801 AMP.

I Aging effect in NUREG-1801 for this component, material and environment combination is not applicable.

Plant Specific Notes:

1 See further evaluation 3.6.2.2.2

2 See further evaluation 3.6.2.2.3